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WITH SUPPLEMENT

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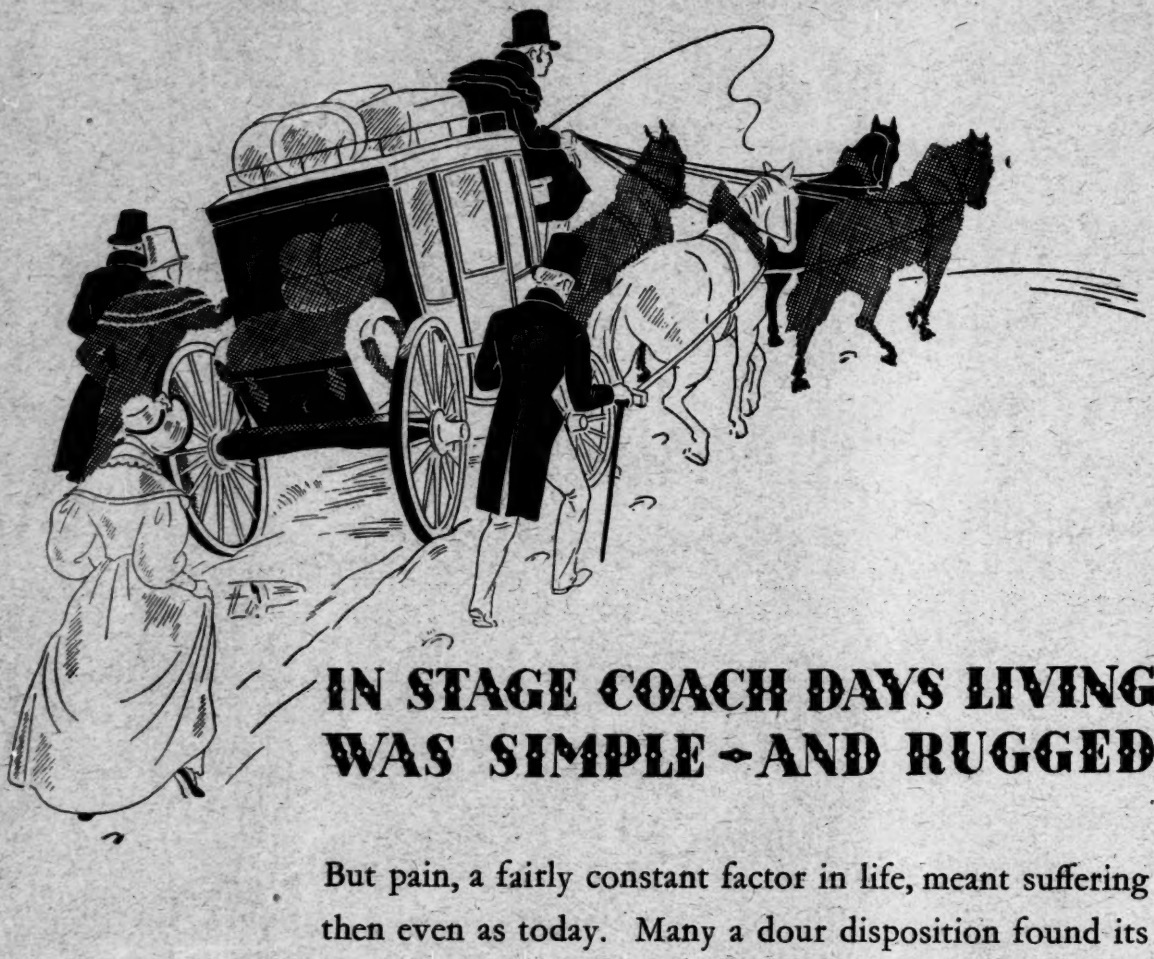

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BRITISH MEDICAL JOURNAL

LONDON SATURDAY MAY 17 1941

TRAUMATIC EPILEPSY AFTER GUNSHOT WOUNDS OF THE HEAD

BY

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The object of this paper is to summarize the results of an inquiry into the fate of men who sustained gunshot wounds of the head in the war of 1914-18, with special reference to the development of epilepsy. Through the kindness of the Director-General of Medical Services, Ministry of Pensions, 540 case notes have been examined. These were taken from the files of the group known as "four-year cases"; that is to say, all the patients survived long enough to be re-examined with a view to final award of pension four years after they were first "boarded" for head injury by the Ministry of Pensions. The material thus does not include those who died from the results of head injury within the first few years, before their pension reached the stage of final award. It is possible also that certain cases of minor injury not severe enough to receive provisional award of pension may have escaped the survey; but a man bearing on his head a visible scar or a hole in his skull as a result of war service seldom failed to appeal and to obtain an award of 20% or more. With these reservations the group may be accepted as a fair sample of gunshot wounds of the head involving bone, and a somewhat selected sample of the severer scalp wounds.

Information Available

Relating to each case are four groups of documents. (1) There are the strictly medical papers—the field medical card, and corresponding medical cards completed at the base hospital in France or elsewhere and at the general hospital in the United Kingdom, and one or more Army Forms I 1237. (2) The medical board papers. Boards were held first, as a rule, when the patient was discharged from hospital, then at intervals of six months, and later of one or two years, until the final board, usually in the period of 1922-5. When a final award had not been granted because the case did not appear to be in a final and stationary condition, or when later appeals were lodged by the man, further medical board reports are available, perhaps as late as 1930, 1935, or more recently. (3) Long after the war many pensioners were admitted to Ministry of Pensions hospitals for observation, and hospital reports are often available. (4) In addition there are the man's non-medical military documents, a collection of papers relating to the non-medical side of pension arrangements, including any letters from the man himself or from his relatives or friends. Should the pensioner at any time come into conflict with the civil power a record of the crime and sentence is to be found.

The most serious omissions from the medical notes are the family history and the previous history of the patient.

Selection of Cases

Of the 540 case records examined 317 have been abstracted, the rest being discarded. Rejections were made solely on account of incomplete notes, especially an incomplete operation note. All cases having adequate notes were accepted, no matter how trivial the injury. No injuries from causes other than gunshot wounds are included in the present series. Wounds of the cerebellum have been excluded.

Incidence of Epilepsy

Of these 317 cases, 107 (34%) had fits. Every patient whose notes record one or more fits is included, yet this figure is perhaps a little low. It has not always been easy to determine from the records whether or not a patient has had fits, but it is reasonably safe to assume the fits to be genuine when they are accepted as an attributable disability by medical boards. The majority of men complaining of fits were admitted to Ministry of Pensions hospitals for observation, often for long periods.

It is possible that an occasional patient was falsely accepted as epileptic. On the other hand, it is probable that a number of cases of genuine epilepsy without full-fledged convulsions were missed. In the records examined there is little or no reference to automatic states and to less outspoken forms of epilepsy. In some cases not regarded by medical boards as genuine epilepsy the description of attacks is nevertheless convincing, and these cases are included in the 107. But they are few, and it is therefore fair to conclude that the figure of 34% is at least not an over-estimate.

The following case reports illustrate the varieties of epilepsy encountered and indicate the sort of data on which the present survey is based.

Major Epilepsy without Obvious Focal Onset

Case No. 108.—Wounded on October 4, 1918, at the age of 17. While advancing the patient was struck by a shell splinter in the left temporal region and knocked down. He stated that he was able to get up immediately and walk to the dressing station, where he lost consciousness, and did not "come to" till three weeks later in England. On arrival at the base hospital he was found to be dysphasic and to have weakness of the right arm, leg, and face. Radiographs revealed a depressed fracture and two metallic fragments one centimetre within the skull, near the Sylvian point. At operation two days after the injury fragments of depressed bone were removed and there was found to be "some loss of brain substance"; the foreign bodies were not seen. Six days after the injury he had a convulsion with loss of consciousness. Occasional slight fits occurred during the rest of his prolonged stay in hospital (the wound did not heal for seven months). He remained hemiplegic, though his leg regained enough power to enable him to walk, and his memory and intelligence were said to be good. The fits grew more frequent; in 1919 they took place twice a month, and in 1921 two operations were performed. The first, in February, revealed the hole in the skull filled with fibrous tissue. Beneath it lay a "large subdural

cyst," which was swabbed out with iodine and filled with a graft of fascia lata and muscle. The fits continued, but were fewer. In June of the same year the wound was reopened, a fruitless search made for the foreign bodies, and a second graft applied. For a time he had up to six fits a week, but the following year only one a fortnight. Improvement, however, was brief. In 1925 fits took him so often that he was unable to go out alone; in 1926 he had two a day, and in 1927 four. In 1930, fifteen years after the injury, fits were so frequent that he required constant attendance.

Case No. 124.—Wounded on July 6, 1915, at the age of 19. This man was struck in the posterior part of the left frontal region near the vertex, and was said to have been unconscious for seven days. He was trephined next day; bone fragments, hair, and dirt were removed from the surface of the brain, the wound drained, and the edges drawn together. Healing was complete in twenty-five days and no focal signs are recorded. Six to nine days later he had two attacks of loss of consciousness, preceded by trembling of both arms. He recovered and was able to carry on his pre-war work of farm labourer, and a year later was engaged in felling timber. In 1920, however, he had another fit, with generalized convulsions in which he bit his tongue and wet himself. For more than a year there was no further attack. In 1922 fits began again, and by 1924 took place every month. When last examined in 1926, eleven years after the injury, he was having fits every week.

Epilepsy with Focal Onset

Out of a total of 107 cases of epilepsy, 33 (31%) are recorded as having a focal onset. This group consists mostly of fits starting with jerking or some abnormal sensation in a limb. In addition there are two cases of occipital injury in which the fits began with flashes of light; three of occipital injury in which the fits began with or were characterized by dimness of vision and blindness; and one of injury to the left temporal lobe having minor fits in which speech was lost. No instances of uncinate fits are recorded. It is possible, therefore, that the focal features of attacks have been overlooked in some cases.

Case No. 175.—This man was wounded at Gallipoli on May 24, 1915, at the age of 31. A bullet glanced off the side of his head, causing a depressed fracture over the lower part of the left Rolandic area. He was unable to speak, and his right arm and leg were powerless and insensitive. Trephining was performed aboard a hospital ship, but the condition of the dura is not stated. Within a year he was able to walk well, but there was still severe sensory loss in his right hand, and speech was hesitant. Fourteen months after the wound he began to have fits. Before a fit he "only saw half a thing," and his right hand went numb; occasionally he lost consciousness and wet himself. At first fits were infrequent; by 1920 they occurred monthly, and in 1924 every week. He was, however, able to retain his job as a gateman. He died of heart failure due to mitral disease in March, 1937.

Case No. 268.—Wounded on July 27, 1917, at the age of 29. A bullet pierced this soldier's steel helmet and ploughed a furrow in his scalp from front to back, an inch to the right of the middle line. The wound was excised four days later, and the bone was seen to be grooved but not broken. The wound was septic, and he lay five months in hospital. The first fit took place a month after he left hospital. It began with pain in the left arm, and consciousness was lost. Similar attacks followed at intervals of about three months. In 1923, seven years after the injury, they ceased. For ten years he had no more. But in 1933 attacks occurred every week for a time, yet ceased once more four months before his last medical board examination (held the same year), at which his pension remained at 50%. There is no record of his ever having had focal signs.

Case No. 127.—Nine months previously this patient had sustained a slight scalp wound, but had remained on duty. On August 20, 1917, at the age of 21, he was struck on the right side of the head by shrapnel balls. One penetrated just in front of the ear, lodged in the bone, and drove a shower of bone fragments into the parietal lobe. On admission to hospital he was semiconscious and disorientated. His head and eyes were deviated to the right, but he could be induced to look to the left, this movement being accompanied by nystagmus. There was left hemiplegia, complete in the arm and almost complete in the leg. Sensory tests were unreliable. He was operated on about twelve hours after injury by Harvey Cushing (1918, Case 36).* The wounds were excised and sutured. The shrapnel ball in the petrous bone was removed, together with many fragments of petrous bone and pieces of helmet lining. In the parietal region the bone and the shrapnel ball in it were removed *en bloc*. From the brain itself fragments of bone, much clot, and disorganized brain were removed to a depth of 5 cm. The wounds healed by first intention. A month later his left leg was nearly normal, and within four months of injury his left hand had a fairly good grasp and was still improving. He was deaf in the right ear. In January, 1918, after he was evacuated from France, an aluminium plate was inserted. A week later he had an attack of twitching of the left side of the face and left arm. He remained fully conscious, the fit was slight, and there was no further attack for a year. Thereafter other attacks followed with increasing frequency, and in 1924, seven years after the wound, they took place two or three times a month. Consciousness was never lost, but whereas twitching had been confined to his arm and face, in later years it spread to his foot.

Petit Mal

Case No. 100.—Wounded on June 24, 1917, at the age of 42. A shell splinter glanced off this man's skull in the left fronto-parietal region, causing an extensive scalp wound but not injuring the bone. His right arm and leg were found to be weak. Power soon returned, and he was able to serve at home till demobilization. He complained that his right hand was still numb, and he was found to have astereognosis, impairment of postural sense in the right hand and right foot, and a right extensor plantar response. Nevertheless he was able for a time to take up his old employment as a blacksmith's striker. When last examined in 1931, fourteen years after the injury, he reported that he had been obliged to relinquish that particular work as he had suffered for some four years from attacks "in which he lost himself for a few minutes."

Case No. 148.—This man sustained a severe penetrating wound of the left lower parieto-occipital region through which the brain fungated. Four months later he began to have attacks which he described as follows: "I feel something inside my head which feels altogether strange. Something goes like a flash through my head and I feel unsteady. At times when I wish to speak my speech goes twisted."

Depth of Wounds and Fits

The incidence of fits in relation to the depth of wound is shown in Table I.

TABLE I.—*Relation between Epilepsy and Depth of Wound, Foreign Bodies, etc.*

Group	Site	No. of Cases	No. with Fits	% with Fits
1 ..	Scalp	66	16	24
2 ..	Fractured skull; dura intact	104	24	23
3 ..	Metal in brain	42	16	38
4 ..	Metal removed from brain	30	16	53
5 ..	Dura torn; brain injury; bone fragments removed or *in situ* (exclusive of Groups 3 and 4)	57	26	46
1 & 2	Dura intact; all cases..	170	40	23
3, 4, 5	Dura penetrated; all cases	129	58	45

Fits are twice as frequent when the dura is penetrated. Nearly half (45%) of such cases are affected.

Metallic Foreign Bodies and Fits

It is remarkable to find that patients who retain fragments of metal in the brain are less liable to fits than those from whose brain metal has been removed (Table I). There are several possible explanations. Surgical removal of the missile may greatly increase the damage to the

* Dr. Cushing's case report describes the head wounds as being on the left side, but the Ministry of Pensions records leave no doubt that they were on the right side.

brain or, under conditions often obtaining in war, increase the sepsis. Another and more acceptable explanation is that most of these retained missiles are small splinters, often less than a centimetre in diameter and often with a small entrance wound. When a man is struck by a large lump of metal it kills him if it penetrates far; if it remains near the surface, though it can be readily removed, it causes much destruction. Consequently, of men surviving penetrating splinter wound of the head, those in whom the metal is retained may well have less cerebral damage and therefore less liability to fits.

The surmise that the cases in which metal was removed from the brain often have more serious brain damage than those in which metal remains *in situ* is supported by the fact that 12 of the 30 from whom metal was removed developed brain fungus, whereas only 3 of the 40 from whom the metal was not removed had fungus. Furthermore, included in the "metal removed" group are 13 through-and-through wounds, and these are usually severe injuries.

The important fact that emerges is that in penetrating wounds the mere presence of a small piece of metal in the brain does not increase the risk of epilepsy.

Other Late Complications, and Deaths

It may be added that so far as the late course is concerned the presence of metal in the brain does not seem to affect the outlook in any way. In fact, apart from epilepsy, late complications are astonishingly rare in the whole series, even in the severest wounds. It is to be remembered that the present study affords no information concerning fatal complications arising within the first four or five years after injury, nor are the records complete enough to give information concerning minor degrees of mental deterioration. No cases in the series were still receiving active treatment, so that the material gives no information about patients requiring permanent institutional treatment on account of psychosis.

Up to the end of 1940 14 patients (4.4%) have died. In only one case (No. 126) can death be attributed with certainty to the injury; in two others (Nos. 79 and 265) there is a probable direct connexion.

Case No. 126.—Wounded on November 1, 1916, at the age of 22. A shell splinter entered the brain in the left Rolandic region, causing a right hemiparesis. The patient was not operated on till the fifth day, when a cerebral abscess was drained. Considerable recovery of power took place, and he was able to work as an auxiliary postman till 1930, when minor attacks of epilepsy began. Major fits developed a year later, ending in a fatal status epilepticus in September, 1934, eighteen years after the wound. Necropsy revealed a "cyst" on the surface of the brain, but there was no trace of abscess or other septic complication.

Case No. 79.—Wounded on September 4, 1917, at the age of 20. There was a small wound of entrance in the left temporal region, and the patient was dysphasic and weak in the right arm. Operation next day revealed much pulped brain, which was removed, along with several fragments of bone. The wound healed in twenty days, and the dysphasia and weakness improved rapidly. *X*-ray examination showed a piece of metal, 1 by 0.5 by 0.4 cm. in diameter, 1 cm. to the left of the middle line and 1.5 cm. above the sella turcica. Fits began in the following year and grew more frequent. In 1933 glycosuria was discovered, and the patient died in diabetic coma in July, 1937, twenty years after his wound.

Case No. 265.—This man was wounded on February 27, 1917, at the age of 23. A scalp wound was sustained in the right parietal region. At operation three days later the wound was excised and the bone was found to be intact. Major fits began in June, 1922, causing him to lose his job as stage-door keeper. By 1929 fits were frequent and prolonged. He died in October, 1938, of "acute bronchitis and chronic epilepsy," twenty-one years after being wounded.

The cause of death in the remaining 11 cases is recorded as: heart disease (5) malignant disease (2), perforated gastric ulcer (1), bronchopneumonia (1), phthisis (1), influenza (1).

In-driven Bone Fragments and Fits

With regard to the significance of in-driven bone fragments and the risk of fits it has not been possible to extract satisfactory data. Judging by our experience at the Military Hospital for Head Injuries and by the reports of members of the Society of British Neurological Surgeons, bone fragments are driven into the brain in almost all penetrating injuries. Good radiographs are needed to detect them, and it is clear from the samples of old *x*-ray plates included in the Ministry of Pensions files that reports of negative radiological findings are unreliable. Many operation notes state that in-driven bone fragments were removed, but there is no guarantee that all of them were. Pieces of buried bone may be overlooked at operation, even with the help of modern radiography; with poor radiographs, or none, fragments will often be left.

Non-penetrating Wounds and Fits

It is surprising to find the incidence of fits in scalp wounds as high as 24% (Table I)—no less, actually, than in wounds fracturing the skull and often depressing bone. The fact that this series of scalp wounds is to some extent selected may account for the high incidence of fits. Many a scalp wound will in itself cause no disability, and the patient may only appeal for a pension should epilepsy follow. But there are other points to be considered. Scalp wounds due to projectiles are by no means the same as those seen in civil practice and due to a fall on the pavement or a blow with a brick. The outward effect on the scalp in the shape of a more or less linear cut is the same, that on the brain beneath quite different. The brick imparts its momentum to a wide area of the skull and brain, or, rather, to the whole head, and usually stuns the victim. The bullet or splinter pierces the scalp and strikes the skull, a very small area of which absorbs its momentum, and often the patient is not concussed. Should the bone be broken it is remarkable how localized the fracture is—often no larger than the missile—showing how concentrated and focal is the blow. It is the exception to see widely radiating cracks which indicate diffusion of force. There is also ample clinical evidence to show that a concentrated impact can injure the underlying brain without breaking the bone, for in these cases focal signs are common (Jefferson, 1919; Cairns, 1941). In this series of 170 cases in which the dura was intact 51 (30%) had focal signs of cerebral damage. Of 104 cases in which there is a note on the state of consciousness 25 are known not to have been unconscious, yet 7 of these developed fits, and in 4 the skull as well as the dura was intact.

Though one cannot readily accept the high figure of 24% as the true incidence of epilepsy in wounds no deeper than the scalp, it is clear that scalp wounds due to projectiles are more likely to be accompanied by local damage to the brain, and therefore epilepsy, than scalp wounds seen in civil practice.

Sepsis and the Incidence of Fits

An important aspect of the problem of traumatic epilepsy is the incidence of fits in relation to sepsis. This is shown in Table II.

TABLE II.—*Relation between Epilepsy and Wound Sepsis*

	No. of Cases	No. with Fits	% of Fits
Wound healed in 15 days	59	13	22
,, ,, 15-60 days ..	59	22	37
,, unhealed after 60 days ..	58	26	45

In this series fits developed twice as often in cases of severe and prolonged sepsis as in those healing by first intention. To obtain a truer estimate of the influence of sepsis the figures must be analysed further. Since both fits and sepsis are commonest when the wounds are deep and severe, the causal relation between sepsis and fits suggested by these figures might be fictitious. In Table III, therefore, the cases are grouped according to the integrity of the dura mater, and we see that the same relation holds for scalp wounds as for penetrating wounds—namely, that fits are commoner when wounds are septic.

TABLE III.—*Relation between Epilepsy and Wound Sepsis*

		% with Fits
Dura intact	Healed in 15 days	12
	,, ,, 15-60 days	30
	Unhealed in 60 days	32
Dura penetrated	Healed in 15 days	36
	,, ,, 15-60 days	50
	Unhealed in 60 days	57

Site of Wound in Relation to Incidence of Epilepsy

Too much reliance should not be placed on these figures (Table IV) nor on those previously published. It is often stated that fits are commonest in parietal lesions, but it is not always clear if " parietal " refers to the bone or to the lobe. There is also a tendency, seen in the records of this series, to describe as parietal any wound not frankly frontal, temporal, or occipital. Furthermore, the damage to the brain giving rise to the fits is not necessarily directly beneath the site of bone injury. For what they are worth the figures (Table IV) show that wounds in and about the Rolandic area are most often followed by fits, and polar wounds least often.

TABLE IV.—*Site of Wound in Relation to Incidence of Epilepsy*

Site		No. of Cases	No. with Fits	% with Fits	% with Fits, All Cases; assuming Equal Proportion of Penetrating and Non-penetrating Wounds
Frontal*	Dura intact ..	49	11	22	26.5
	Dura penetrated	35	11	31	
Rolandic	Dura intact ..	26	10	38.5	46.0
	Dura penetrated	28	15	54	
Parietal*	Dura intact ..	52	13	25	38.5
	Dura penetrated	23	12	52	
Temporal*	Dura intact ..	19	5	26	42.5
	Dura penetrated	17	10	59	
Occipital*	Dura intact ..	22	3	14	27.5
	Dura penetrated	22	9	41	

* Refers to the lobe, not the bone.

As a rough approximation it may be said that the further a wound lies from those portions of the cortex where sensori-motor function is predominantly represented, the less chance is there of subsequent epilepsy. Though it is legitimate to conclude that lesions near the sensori-motor cortex more often lead to epilepsy than do those at the poles of the cerebral hemisphere, the figures make it clear that the influence of the site of the wound on the liability to epilepsy is not great.

Concussion and the Incidence of Fits

The importance of local brain damage as the essential factor causing epilepsy in gunshot wounds of the head is emphasized in another way. In 104 cases the effect of the wound on consciousness is recorded. In 55 the dura was intact. In these the incidence of fits was practically as high in those remaining conscious as in those concussed (Table V).

TABLE V.—*Concussion and Incidence of Epilepsy*

	No. of Cases with Dura Intact	No. with Fits	% with Fits
Not unconscious	19	5	26
Unconscious	36	10	18

Time of Onset of Fits

The first fit may take place within a few hours of injury or may be delayed as long as twenty years. In this series information of the time of onset of epilepsy is available in 84 of the 107 cases, and is given in Table VI. When fits began while the patient was still in hospital the precise date of onset was usually available; but when fits began after discharge from hospital, which usually took place about three months after injury, the exact time of onset is often not recorded. The accompanying chart is

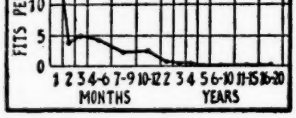

Chart showing monthly incidence of onset of epilepsy.

a graphical expression of Table VI, and shows the monthly incidence of onset of fits. For the reasons just stated the monthly incidence after the first three months is expressed on the chart as an average of three-monthly periods for the remainder of the year, and as an average of each period of twelve months from the second to fifth year.

TABLE VI.—*Time of Onset of First Fit*

	Months						Years					
	1	2	3	4–6	7–9	10–12	2	3	4	5	6–10	11–15	16–20
No. of new cases of epilepsy	19	4	5	13	7	8	10	4	4	1	6	1	2

It will be observed that the rate of onset of fits during the first month exceeds by more than four times that of any subsequent month. After the initial fall it remains stationary till the sixth month, then falls again, till at the end of the second year a very low figure is reached. During the next three years the rate of onset declines further, and after four years is barely above the base-line. Only about one patient in twenty-seven developed epilepsy between the fifth and twentieth years.

Course of the Epilepsy

Information concerning the course of the epilepsy is available in 96 of the 107 cases.* In 30 of these, fits ceased some years before the final examination. The cases may thus be separated into two groups: those with persistent epilepsy and those with temporary epilepsy. By *persistent epilepsy* is meant that in which attacks were known to continue when the patient was last examined. By *temporary epilepsy* is meant that which is known to have ceased some years before the final award of pension.

The cases of temporary epilepsy fall into two distinct categories. In 11 of the 19 patients who had fits within the first days after injury (Table VI) fits ceased within the first fortnight, not to return (Category I). It is to be noted that there were no cases in which fits began in the

* These 96 cases comprise the 84 cases of which the time of onset is known and an additional 12 cases in which the later history but not the time of onset was available.

third and fourth weeks. This prevalence of epilepsy within the first fortnight after injury is doubtless connected with the presence of recent cortical damage due to haemorrhage or infection, and it accords with the not uncommon experience of fits in the first days after operations upon the brain, or after spontaneous subarachnoid haemorrhage. As in these conditions, fits occurring soon after injury are of little prognostic significance for the occurrence of late epilepsy.

There are a further 19 cases in which fits eventually ceased, but after a much longer interval (Category II). In 3 of these, fits began within the first two weeks and continued for two and a half, three, and four years respectively. The other 16 cases of temporary epilepsy began three months to two years after the wound, to disappear one to four years later. The average interval between the last fit recorded and the final examination is five years, the shortest two, and the longest eleven years.

Examples of prolonged temporary fits are afforded by the following cases.

Case No. 82.—Wounded on March 24, 1918, at the age of 24, by a shell splinter in the right lower anterior parietal region. Four days later at a base hospital the patient was trephined, and many fragments of bone were removed from the brain. Seven days after the wound he is described as being very dull but without paralysis. A week later a large fungus developed, and with it complete hemiplegia. He was doubly incontinent and remained critically ill for many weeks. Nine weeks after injury much of the fungus was cut away, and after a further three months the wound eventually healed. Very little power or sensation returned in the paralysed limbs. About a year after the wound he began to have fits every month, in which he lost consciousness and was incontinent. When last examined in 1934, sixteen years after the wound, he had had no fits for over ten years.

Case No. 210.—This man was wounded on June 23, 1916, at the age of 29, by trench-mortar fire. He was struck in the right frontal region. He was not unconscious, and the wound was trivial. Radiographs revealed neither foreign body nor fracture. No operation was performed, and he was back on duty at the end of the week. The next day he had an attack of twitching of the left hand, spreading to the whole of the left side, and he was sent to England. While under observation in hospital he had two more Jacksonian attacks. After leaving hospital in August he returned to duty and was sent to Salonika in April, 1917. He remained well until January, 1918, eighteen months after his wound, when the fits recurred and he had as many as fourteen in one day. On January 22 a trephine opening was made over the arm area of the motor cortex, some distance posterior to the site of the wound. Nothing abnormal was found. Fits continued on and off till June, then grew less frequent and ceased. At the time of his last attendance before the medical board he had had no fits for five years; his sole complaint was of giddiness on stooping at his work as a farm labourer, and he was awarded a pension of 30%, mostly on the basis of the trephine hole in his skull He had never appealed for more pension.

In the 19 cases categorized as prolonged temporary epilepsy there may be some that have had unrecorded attacks since the last examination, but in view of the fact that some of the patients have been free from fits for as long as eleven years it is not possible to explain away the impermanence of the epilepsy on this basis. What part may have been played by sedative drugs cannot be determined from the information available. In two of the cases the delayed onset of septic complications in the wound may have contributed to the presence of the temporary epilepsy.

In all the cases in which fits began more than two years after receipt of the wound the epilepsy was of a persistent character, attacks continuing up to the time of the last examination (Table VII).

TABLE VII.—*Time of Onset of First Fit in Relation to the Course*

	Weeks			Months					Years	
	1	2	3 & 4	2	3	4-6	7-9	10-12	2	3-20
Temporary	12	2	0	0	2	3	0	1	3	0
Persistent..	3	2	0	4	3	10	7	7	7	18

Epilepsy is more likely to be of a persistent character in those cases in which the dura was penetrated by the wound (Table VIII).

TABLE VIII.—*Relation of Integrity of Dura to Temporary and Persistent Epilepsy*

	Temporary Fits	Persistent Fits
Dura intact	41% (7 of 16 ceased in first 2 weeks)	59%
Dura penetrated	26% (3 of 14 ceased in first 2 weeks)	74%

When the focal signs clear up the prospect of the epilepsy also clearing up is enhanced (Table IX).

TABLE IX.—*Influence of Recovery of Focal Signs on the Course of the Epilepsy*

	Temporary Fits	Persistent Fits
Transient focal signs	37%	12%
Permanent focal signs	26%	46%

These late follow-up results thus show that in about one-third of the patients having fits after gunshot wound of the head epilepsy may be of a more or less transient character. The earlier the fits begin the less likely are they to become persistent. In the first week after injury, if we may judge from this series, the risk of a man having fits is about 5% (15 of 317 cases), but the risk of the fits becoming persistent is only 1 in 5. Fits starting in the second week stand an equal chance of being temporary or of becoming persistent. As the weeks pass the odds against the fits being of a temporary character rapidly increase. From the sixth month to the end of the second year the risk of developing epilepsy is about 10%, but the odds favour the epilepsy becoming persistent as 5 to 1. If the onset of fits is delayed beyond two years the epilepsy will be persistent.*

Summary

The Ministry of Pensions records of 317 cases of gunshot wound of the head of the 1914-18 war have been examined with regard to the occurrence of epilepsy. The series represents a fair sample of head injuries that were severe enough to receive an award of pension yet not so severe as to cause death in the first four years after injury. The period of follow-up varies from about seven to twenty years. Blunt injuries and wounds of the cerebellum have been excluded.

Of the 317 cases 107 (34%) developed epilepsy.

Up to the end of 1940, 14 (4.4%) of the patients had died. One, and probably two others, died of complications of the brain wound, the remaining 11 of intercurrent conditions.

In cases in which the dura had been penetrated fits were twice as frequent (45%) as in the scalp and skull wounds in which the dura was intact (23%).

Scalp wounds due to missiles are more likely to be followed by epilepsy than are scalp wounds due to blunt injury.

There was no evidence that removal of metallic foreign bodies from the brain diminished the liability to epilepsy.

* In this connexion it is necessary to add that the series gives no information about the effect of operative excision of brain scars upon the course of the epilepsy.

Prolonged wound sepsis, as indicated by delayed healing, favours the subsequent onset of epilepsy both in cases in which the dura has been penetrated and in those in which the integrity of the dura has been preserved.

Epilepsy is more common after wounds affecting the sensori-motor cortex than after wounds of the polar regions of the cerebral hemisphere.

The presence or absence of concussion (immediate unconsciousness) after gunshot wound does not influence the subsequent liability to epilepsy.

The first fit may occur within a few hours after injury or may be delayed at least as long as twenty years. Epilepsy begins more often in the first two weeks, and thereafter the liability to develop epilepsy progressively diminishes.

In 30 of the 96 cases in which the course of the epilepsy is known fits ceased some years before the patient was last examined. This subsidence of epilepsy occurred most often in cases in which fits began in the first fortnight after injury, less frequently when fits began within the first two years, and never when the first fit occurred more than two years after the injury.

It is a pleasure to record my thanks to Dr. Prideaux of the Ministry of Pensions for his kindness in arranging for examination of the case records, and for much help in their interpretation. I am especially indebted to Colonel Hugh Cairns for his constant advice and great help in revision of this paper.

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RECENT MORTALITY FROM BRONCHITIS IN LONDON

BY

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Until the Registrar-General's Annual Statistical Review appears there is no information as to the main causes of death throughout the whole country in any period of time. Such records were last published for the year 1938, but figures are given for the administrative county of London under "short list" headings in the weekly returns, which have continued to be published since the outbreak of war. It is possible, therefore, to compare the experience of the years 1939 and 1940 with that of previous years for this area. The fifty-two weeks covered by the weekly returns do not coincide exactly with calendar years, but the slight error in taking the sum of the figures contained in them as a year's experience is unimportant. When this is done the very great increase in the number of deaths classed in 1940 as being due to bronchitis immediately hits the eye. Stocks (1940) has shown that the greatest single cause contributing to a general excess of deaths at ages over 45 in London between January 7 and February 17, 1940, was bronchitis. During this short period deaths from all causes exceeded the number expected on the basis of the same weeks in 1939 by 1,900, or nearly 33%; those from bronchitis were 800 (106%) in excess. With all the information of the Registrar-General's office at his disposal he was in a position to eliminate the several fallacies of comparison which will be discussed later, and the great increase in mortality from bronchitis he reveals must be accepted as real. The period of time was, however, very short, and a lesser but substantial excess in the deaths from some other causes, such as influenza, pneumonia, and heart diseases, which he demonstrated then would probably not have been sustained if the figures for a longer period had been examined by the same methods. He drew attention to the fact that these rises coincided with the exceptionally cold spell of weather in January and February. The point is important, for any change of mortality which is contemporaneous with the war is apt to be regarded as one of its results. The experience of the whole year therefore deserves as careful examination as possible.

Statistical Discontinuities

At the outset we are faced with certain difficulties. We know that the population of the administrative county of London has been falling steadily for some time. Between 1921 and 1931 it fell from 4,484,523 to 4,396,821—i.e., by nearly 2%. The mid-year estimate for 1938 was 4,062,800, representing a rapid decline of more than 8% during the seven years since 1931. So long as comparisons of death rates, not merely of deaths, are made this fall does not matter. In 1939 the population was estimated at 4,013,400, but this figure was adjusted for death-rate purposes to 3,780,700 in order to allow for evacuation movements and the exclusion from the death returns of non-civilian deaths since the outbreak of war (L.C.C. Report, 1939). Estimates for 1940 have not yet been published and are beyond the competence of anyone without access to official records, but it would not be unreasonable to suppose that the deaths in 1940 occurred among a population not exceeding, on the average, three and a half millions. If this is so we should expect a reduction in the number of deaths from all causes, as compared with the average of the previous ten years, of at least 16%, in the absence of factors inhibiting such a decline. Further, since the outbreak of war deaths have been assigned to the place of occurrence and not to residence. This may seriously affect comparability. In the circumstances of 1940 it would probably reduce the recorded deaths from natural causes in London. A still more serious interference with continuity is the change made by the Registrar-General in the method of classifying causes of death since the beginning of 1940. Whereas formerly the selection of one cause for the purpose of classification from more than one stated in a death certificate was made according to arbitrary rules, it is now determined so far as is possible by the order of preference indicated by the certifying practitioner. It is easy to see that this change (which was bound to come sooner or later) gravely affects comparison with the statistics of previous years. The adoption at the same time of the 1938 revision of the International List of Causes of Death is less likely to affect the comparability of figures relating to those causes with which this paper is concerned. It is, at least, clear that, for the present, the large number of deaths from bronchitis in 1940 has to be examined without any attempt to express it as a death rate, and that we must make sure that it is not an artificial result of changes in statistical procedure.

In a normal year nearly 90% of the deaths classed as due to bronchitis in London occur at ages over 45. It is therefore a cause mainly affecting those who have passed middle age, and it rapidly increases in old age. In 1939 92% were over 45, and in 1940 the proportion rose to 95%. The reasons for this rise may be disregarded for our present purpose. The point is that we are considering for 1940 a condition affecting the usual elderly age group of the population. It kills especially those whose cardio-vascular and renal systems, as well as the respiratory, are degenerating. When death occurs it must often be hard

for the practitioner to decide whether the most important cause is respiratory or cardiovascular or even, on occasions, renal. He may mention one or more of these systems in his certificate. In the past the Registrar-General of England and Wales has placed bronchitis very low in the order of preference. He chose a definite cardiovascular against any respiratory cause except lobar pneumonia (and, of course, influenza) if both were stated on one certificate, but a comparison recently made by the United States Government of the classification of the same group of certified deaths by the statistical departments of several countries showed that this policy was not so much favoured in some of them (Bureau of Census, Washington : Vital Statistics). Within our own country the preferences of medical practitioners differ from those shown by the Registrar-General in the past, and they also change with advancing knowledge, or, it may be, with medical fashion. Fashion, of course, has not suddenly changed in 1940. From year to year the Registrar-General has shown how bronchitis and old age have declined as assigned causes of death over 70 years of age, their place having been taken largely by heart diseases through increasing use of the terms " myocarditis " and " myocardial degeneration." A death ascribed to " bronchitis and myocardial degeneration " has hitherto been classed under the latter heading, whereas it is probable that if practitioners had been restricted to one single cause many would have preferred " bronchitis." The growth in the proportion of certificates showing such multiple causes no doubt accounts for much of the recorded fall in death from bronchitis and the rise of heart disease. The effect of following the practitioner's choice instead of the statistician's is revealed in the Annual Statistical Review for 1937 (Registrar-General's Review, 1937). It is shown for the records of 1936 and 1937 that a change from the arbitrary rules to acceptance of the certifier's choice would have reduced the deaths throughout England and Wales classed to heart diseases by about 28,000, or 22%, and increased bronchitis by 15,000 to 16,000, or 86 to 89%. Here, then, is a very great discrepancy, especially in the recorded mortality of bronchitis, which must vitiate all comparisons between 1940 and previous years until the figures are published by the Registrar-General in comparable form. On the other hand, nephritis would have been increased by only 1% under the new system.

Comparison with Previous Years

It is necessary to keep these facts in mind when examining the London statistics for 1940. For reasons already given it is not practicable to compare the death rates with those of previous years ; but the actual deaths classified to certain causes are shown here in tabular form, their relation to those of previous periods being brought out in the second half of the accompanying table. In addition to the average for the ten years 1930 to 1939 (inclusive), the year 1929 has been shown separately because influenza was unusually prevalent then, a fact which has a bearing on the number of deaths classed to bronchitis.

For obvious reasons deaths from violence other than suicide are not included in the deaths from all causes for each period stated in the tabulation. The total number of deaths from all other causes has fallen by less than 9% as compared with 1930-9. As already indicated a greater fall might have been expected from the reduction of population, although old folks, who contribute heavily to the deaths, probably have not left London in such a high proportion as younger people. On the other hand, the deaths in 1940 were 27% lower than in 1929, a fact which, taken in conjunction with the very great difference in influenza certifications in these two years, confirms the common observation that no serious epidemic of this disease occurred in 1940. All respiratory causes taken together (including influenza) have risen, but to nothing like the level of 1929. In this group, however, bronchitis alone accounted for even more deaths than in 1929, the deaths from this cause far exceeding those from pneumonia for the first time in any of the years under consideration, and being nearly two and a half times the average of the previous ten years. The fall in pneumonia deaths was a little greater than might have been expected, and when this is viewed along with a considerable increase in the deaths classed to " other respiratory causes " as well as to bronchitis, it may be suspected that there has been an artificial inflation in these latter categories at the expense of pneumonia. The Registrar-General's inquiry indicated that the new system might lead to a very slight increase of recorded pneumonia, and the absence of epidemic influenza may have been in itself sufficient to account for the relatively low figure for pneumonia, but the influence of sulphonamide therapy has also to be kept in mind.

When we turn to the cardiovascular group a marked discrepancy is observed between the behaviour of deaths from cerebral vascular lesions (cerebral haemorrhage, apoplexy, etc.) and other cardiovascular causes. The sharp rise in the former is possibly statistical rather than real, although there was no indication from the Registrar-General's inquiry that this might be expected. The stress of these times may be a partial explanation. It is better, however, to take the two groups of causes together. There is less of a drop (2%) in the deaths from all cardiovascular causes than might have been expected from the fall of the population and the change of method in classification. The smallness of the decline may be due to the same reason as the rise in bronchitis. It is probable that, if the old

Table showing Mortality in London (Administrative County)

	Deaths from Certain Causes, 1929, 1930-9, and 1940*			Deaths in 1929 and 1940 compared with the Mean Annual Number of Deaths in 1930-9 taken as 1,000		
	Annual Mean			Annual Mean		
	1929	1930-9	1940	1929	1930-9	1940
All causes, less violence other than suicide	60,873	48,805	44,548	1,247	1,000	913
Influenza	3,118	908	537	3,433	1,000	591
Bronchitis	4,272	1,915	4,675	2,231	1,000	2,441
Pneumonia (all forms)	5,883	3,426	2,784	1,717	1,000	813
Other respiratory causes	879	515	755	1,705	1,000	1,465
Total influenza and respiratory	14,152	6,764	8,751	2,092	1,000	1,294
Cerebral vascular lesions	2,179	1,896	3,069	1,149	1,000	1,618
Other cardiovascular causes	15,273	15,554	14,064	982	1,000	904
Total cardiovascular	17,452	17,450	17,133	1,000	1,000	982
Nephritis	1,820	1,518	1,043	1,199	1,000	687

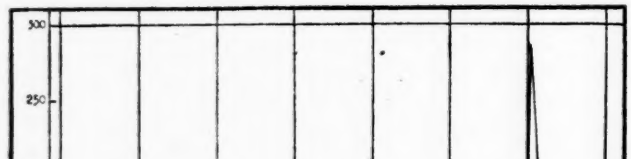
* Figures for 1939 and 1940 are the sum of the weekly returns, which do not coincide exactly with calendar years.

system of selection for classification had persisted, still more deaths would have appeared in the circulatory group and fewer as bronchitis, but that both would have shown an increase. Nephritis has declined substantially as compared with the average of the previous ten years; but this is part of a steady and quite rapid process over the years, and the figure for 1940 actually exceeded that for 1939 in spite of the fall of population. There is thus no evidence that bronchitis has borrowed materially from nephritis. This, like the other degenerative causes, may really have increased in 1940. The same comment applies to "old age,"* which has been figuring less and less in London statistics, but which nevertheless accounted for 226 more deaths in 1940 than in 1939. For purposes of classification it is still ignored as a cause if it is associated with any definite disease. The only other large category which showed a substantial decline was "other specified causes" (from 1,731 in 1939 to 1,229 in 1940, a difference of 502), but it is doubtful whether many of these would find their way to bronchitis by a change in the system of classification.

Discussion

The general conclusion from these considerations is that a large part of the increase of the deaths ascribed to bronchitis in the weekly returns for London in 1940 was fictitious, but that part of it was genuine. This part could not be attributed to influenza. It was associated with an increase, or less than the expected decrease, of certain other causes of death common among the elderly. Was it a result of war conditions?

The mortality from bronchitis, like other respiratory causes, and indeed like nearly all causes of death, has a definite seasonal distribution. Between 1921 and 1925 the average maximum for the whole country was in February and the minimum in August (Registrar-General's Review, 1925). In the chart shown here the average weekly number



London (Administrative County): average weekly recorded number of deaths over 45 years of age from bronchitis, in four-week periods, from November, 1933, to March, 1941.

of deaths over 45 years of age from bronchitis in London is given in periods of four weeks from November, 1933, to March, 1941. The comparison before and after the beginning of 1940 is valid, of course, only for seasonal occurrence and not in relation to its magnitude. It will be seen that the peak most often occurred in the first four weeks. In this respect 1940 conformed to type. In so far as there was a real increase in mortality from bronchitis, most of it was in the beginning of the year, before the people began to resort to shelters. The most notable feature of this season was the rigour of the weather. Unfortunately, meteorological records have not yet been published, but the weather in December, January, and February is known to have been exceptionally severe. Russell (1924, 1926) has drawn attention to the dominating effect of atmospheric temperature on respiratory mortality even in the absence of fog. The bitter weather at the beginning of 1940 was in itself probably enough to account for any increase in deaths from bronchitis and other causes among old people. If towards the end of the year shelter-life and exposure had any effect it was apparently not great, when the artificiality of much of the apparent increase is kept in mind. In 1941 the cold spell, severe but rather less so than in 1940, came later in the year, and the peak of bronchitis deaths was delayed till the second four weeks, when it was quite pronounced. It is, of course, possible that in both these seasons the effect of the black-out exaggerated the influence of the ill ventilation which always accompanies cold weather and favours respiratory infection; but the conclusion seems reasonable that the real part of the increase in mortality from bronchitis and other causes among old folks was mainly attributable to exceptional weather conditions and not to circumstances arising from war.

* Figures of old age are not included in the table because this heading did not appear in the short list till 1931.

Summary

There was a great increase of recorded mortality from bronchitis in London in 1940, affecting the elderly.

A large part of it was an artificial result of a change in the system of selecting one cause for classification from more than one cause stated in death certificates.

In so far as it was real it occurred mainly at the beginning of the year, as usual.

It was not due to an epidemic of influenza.

It occurred, probably along with an excess over the expected number of deaths of old people from other causes, during one of the most severe spells of weather this country has experienced, and should not be regarded as having been due to war conditions.

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The Royal New Zealand Society for the Health of Women and Children, which was founded by the late Sir Truby King, gives in its latest annual report some of the vital statistics of the Dominion. The birth rate in 1939 (excluding Maoris) was 18.73 per 1,000, the highest recorded since 1930. The maternal mortality rate, excluding septic abortion, was 2.95, and the infantile mortality rate 31.14 per 1,000 births, almost the lowest ever recorded. The death rate during the first month of life was 21.8, an improvement on the figure for recent years. The names and addresses of all infants who died during the year were obtained from the Registrar, and the Plunket nurses employed by the society investigated every case. An inquiry has also been made into the extent and duration of breast-feeding in New Zealand and the causes of early weaning, the outstanding one being failure of the milk supply of the mother. During the year further efforts have been made by the Plunket nurses to extend their pre-school work, and a ready response has been made by the parents. The society has six infants' hospitals in various parts of New Zealand, and the 138 Plunket nurses in its service saw 22,000 new cases during the most recent year, and paid 170,000 visits to homes.

THE BACTERIOSTATIC EFFECT OF DISINFECTANTS IN HUMAN SERUM AND CITRATED PLASMA

BY

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Although human serum is not a good medium for bacterial growth, bacteria will remain viable in it, and certain organisms will grow in it even at temperatures as low as 0° C. This is also true for reconstituted dried serum, so that bacterial infection is a potential danger in the use of reconstituted dried serum as a transfusion fluid—particularly since during the process of solution serum may become contaminated either through careless handling or by the use of non-sterile water in dissolving the serum. It is improbable that serum contaminated in this way would be a danger to the patient if it were used immediately after reconstitution, but if it were allowed to stand under bad conditions of temperature bacterial growth would take place. Therefore an attempt has been made to find a disinfectant which could be added to the serum before drying, or to the dissolving fluid, in a concentration that would be bacteriostatic and yet within the limits of toxicity even when large volumes of serum were transfused. At a later stage an experiment on citrated plasma was included.

During the course of the experiments it was found that *Staph. aureus*, *Micrococcus tetragenus*, and an enterococcus grew readily in serum from an original inoculum of 20 organisms per c.cm. Under similar conditions no growth of anthrax, streptococci of the "Oakley" strain, *Bact. aertrycke*, *Bact. shigae*, or *Bact. coli* could be demonstrated, while *B. subtilis* grew in serum after a preliminary delay during which the presence of living organisms could not be proved. The work was therefore carried out using *Staph. aureus*, *M. tetragenus*, *B. subtilis*, and an enterococcus as contaminating organisms in the serum. These organisms might reasonably be expected to be found as contaminants in stored serum or plasma, and members of the *subtilis-megatherium* group, micrococci, and pseudomonas have been isolated from serum received at this laboratory for drying.

A disinfectant to be used for the preservation of stored serum should be soluble enough to be added in a concentration that will not dilute the serum unduly. It must not react with serum proteins to alter their physical characteristics, and must be active as a bacteriostatic within the limits of toxicity of the drug even when large volumes of fluid are to be used. During the course of the experiments eight disinfectants were tried. These included four mercurials—merthiolate, metaphen, phenyl mercuric nitrate, and phenyl mercuric acetate; also proflavine, sulphanilamide, thymol, and *p*-chlor-*m*-cresol.

Effective Range of the Disinfectants

The effective range of concentration of each disinfectant was first determined. To 0.9 c.cm. of serum or reconstituted dried serum was added 0.1 c.cm. of a suitable concentration of disinfectant, depending on its solubility in water; from this mixture a series of falling dilutions was made in serum. In the case of metaphen four doubled dilutions were made, but with the other disinfectants four or five decimal dilutions were used, and of each dilution three tubes were set up. To each tube 0.02 c.cm. of a saline suspension containing 2,000, 200, or 20 organisms was added, and a control tube containing 1 c.cm. of serum without disinfectant was inoculated with each suspension. The tubes were incubated at 37° C., and growth was tested by making a stroke inoculation on an agar plate at intervals. Saline suspensions of bacteria were prepared by washing the growth from a twenty-four-hour agar slope culture and diluting with sterile saline until the suspension contained 1,000 million organisms per c.cm. measured by opacity. Dilutions of 1/1,000, 1/10,000, and 1/100,000 were made from this, and one drop from a fifty-drop pipette was used as an inoculum so that each drop contained 2,000, 200, or 20 organisms. The test organisms used in this series were *Staph. aureus* and *B. subtilis*.

Results of a typical experiment are shown in Table I, which indicates that 1/125,000 is the minimal concentration of phenyl

TABLE I.—*Phenyl Mercuric Nitrate: Three Days' Incubation at 37° C.*

Growth Medium	Organism + Inoculum	Dilution of Disinfectant				Control (no Disinfectant)
		1/12,500	1/125,000	1/1,250,000	1/12,500,000	
Filtered serum	Staph. aureus 20/c.cm.	−	−	−	+	+
	200/c.cm.	−	−	+	+	+
	2,000/c.cm.	−	−	+	+	+
Reconstituted dried serum	20/c.cm.	−	−	+	+	+
	200/c.cm.	−	−	+	+	+
	2,000 c.cm.	−	−	+	+	+

+, growth on subculture; −, no growth.

mercuric nitrate capable of preventing the growth of *Staph. aureus* in serum. The results for tests on the eight disinfectants are presented in Table II; the effect of size of

TABLE II

Disinfectant	Range of Dilutions Tested	Medium	Test Organism	Incubation Time (days)	Highest Dilution to Inhibit Growth
Metaphen ..	1/20,000 to 1/160,000	Reconstituted dried serum	Staph. aureus	1	1/80,000
				4	1/80,000
				6	1/80,000
			B. subtilis	1	1/160,000
				4	1/160,000
				6	1/160,000
		Filtered serum	Staph. aureus	1	1/40,000
				4	1/20,000
				6	1/20,000
			B. subtilis	4	1/20,000
Merthiolate ..	1/10,000 to 1/10,000,000	Filtered serum	Staph. aureus	1	1/100,000
				6	1/100,000
		Reconstituted dried serum		1	1/1,000,000
				6	1/100,000
Phenyl mercuric nitrate ..	1/12,500 to 1/12,500,000	Filtered serum	Staph. aureus	1	1/125,000
				6	1/125,000
			B. subtilis	1	1/1,250,000
				6	1/125,000,000
		Reconstituted dried serum	Staph. aureus	1	1/125,000
				6	1/125,000
			B. subtilis	1	1/1,250,000
				6	1/125,000,000
Phenyl mercuric acetate ..	1/10,000 to 1/1,000,000	Filtered serum	Staph. aureus	1	1/1,000,000
				3	1/1,000,000
		Reconstituted dried serum		1	1/1,000,000
				3	1/100,000
Proflavine ..	1/1,000 to 1/1,000,000	Filtered serum	Staph. aureus	1	1/100,000
				4	1/100,000
Thymol	1/2,000 to 1/2,000,000	Filtered serum	Staph. aureus	1	Growth in 1/2,000
			B. subtilis	1	Growth in 1/2,000
p-chlor-*m*-cresol	1/2,000 to 1/2,000,000	Filtered serum	Staph. aureus	1	1/200,000
				3	1/2,000
		Reconstituted dried serum		1	Growth in 1/2,000
				3	Growth in 1/2,000

inoculum has been neglected, since no gross differences could be demonstrated by varying the size of inoculum between 20 organisms and 2,000 organisms per c.cm. As is shown in Table II, the lowest concentration of disinfectant in serum which will inhibit growth has been determined.

Testing for Viable Organisms

In a second series of experiments an attempt has been made to see whether viable organisms were still present despite the absence of growth in the serum. So viable counts were

carried out on reconstituted dried serum inoculated with a suitable organism and incubated at 37° C. with the highest dilution of disinfectant which in the experiments described in the previous paragraph had been shown to inhibit bacterial growth. In this series the inoculum was always 20 organisms per c.cm

Method.—To 9 c.cm. of reconstituted dried serum made up to normal concentration 1 c.cm. of a suitable dilution of disinfectant was added so that the final disinfectant-serum mixture contained a dilution of disinfectant which had been shown to inhibit growth (Table II). Each tube was inoculated with 0.2 c.cm. of a saline suspension of bacteria, prepared as before, the final concentration of bacteria being 20 organisms per c.cm. Control tubes containing 10 c.cm. of serum without disinfectant were inoculated with 0.2 c.cm. of the same suspension; the tubes were incubated at 37° C. Similar tubes were set up using citrated plasma as the growth medium for the bacteria. Viable counts were carried out by Miles's (Aitken, Barling, and Miles, 1936) " surface viable " technique after variable periods of time, but if growth in the serum-disinfectant mixture could be demonstrated at an early stage further counts were omitted. Three decimal dilutions were made in sterile saline, and a drop from a 50-drop pipette was allowed to fall on each of three marked places on an over-dried agar plate; each count is the average of three such drop areas containing a suitable number of colonies. Similar counts were carried out on control sera. As a routine the sera were inoculated with *Staph. aureus*, *B. subtilis*, and an enterococcus. Drop areas of *Staph. aureus* and enterococcus containing up to 60 colonies could be counted accurately, but the *subtilis* colonies were very large, and from 8 to 20 only could be counted. The results with this organism are therefore less accurate. The method of testing for viable organisms by plating from a ten-times dilution of the serum-disinfectant mixture was based on the assumption that by diluting the serum-disinfectant mixture ten times the concentration of disinfectant becomes low enough to allow inhibited but still viable organisms in the original disinfectant mixture to grow in the lower concentration. Thus serum containing merthiolate 1/100,000 inhibited the growth of *Staph. aureus*, but, on diluting, these organisms were able to grow. The dilution to 1/1,000 was made in order to get drop areas which would contain a countable number of colonies.

Results.—A summary of results is presented in Table III. In the case of merthiolate and phenyl mercuric nitrate (1/100,000) growth of bacteria could be demonstrated on diluting the serum-disinfectant mixture, so that fresh experiments were set up. Merthiolate was tried in a dilution of 1/10,000 because that dilution was already commonly used in the preservation of citrated plasma and was found to be effective in this concentration. Phenyl mercuric nitrate, except when the serum was contaminated with enterococcus, was effective in a concentration of 1/50,000.

Effects of Use of Disinfectants

Effect of Drying Disinfectant with Serum.—Sulphanilamide, metaphen, phenyl mecuric nitrate, and proflavine were added to the serum before drying, and the bacteriostatic power was estimated after reconstitution. So far as could be seen, freezing at − 20° C. and drying had no effect either on the bacteriostatic power of the disinfectant or on the solubility of the serum. Bacterial counts were also made on serum which had been made up to four times the normal concentration on reconstituting. Again no difference in bacteriostatic power of the disinfectant could be detected.

Effect on Pseudomonas pyocyanea.—In a bottle of reconstituted dried serum containing phenyl mercuric nitrate 1/10,000, from which a sample of serum had been taken with a chemically clean pipette for an osmotic pressure estimation, *Ps. pyocyanea* was found to be growing profusely. A loopful of this serum was added to serum containing 1/10,000 proflavine, and a loopful of a saline suspension of this organism was added to dried serum containing merthiolate, metaphen.

TABLE III.—*Growth in the Presence of Disinfectant*

Organism	Medium	Incubation Time (Days)	Control (no Disinfectant)	Sulphanilamide 1/5,000	Phenyl Mercuric Nitrate	Phenyl Mercuric Acetate	Metaphen	Merthiolate	Proflavine
M. tetragenus ..	Dried serum reconstituted to 4× normal	1	47,000,000	No growth					
		2	466,000,000	4,150					
		7	545,000,000	53,000,000					
Staph. aureus	.. ..	1	201,500	No growth					
		2	24,600,000	9,000					
		7	91,500,000	2,900,000					
B. subtilis	.. ..	1	5,000	No growth					
		2	2,500,000	..					
Enterococcus	Dried serum, normal concentration	1	210,000,000	1,800,000					
							1/10,000		
Staph. aureus ..	Dried serum, normal concentration	1	220,000				No growth		
		3	15,500,000				..		
		7	18,500,000				..		
B. subtilis	.. ..	1	No growth 1/100				..		
		3	450,000				..		
		7	60,000,000				..		
Enterococcus	.. ..	1	805,000,000				140,000		
					1/100,000	1/100,000		1/100,000	1/100,000
Staph. aureus ..	Dried serum, normal concentration	3	200,000		No growth	2,000,000		17,800	No growth
		9	13,000,000		Growth +				512,000
B. subtilis	.. ..	3	130,000		200,000	No growth		2,000	No growth
		9	600,000		..	..		..	..
Enterococcus	.. ..	3	58,000,000		700,000	..		Uncountable	..
		9	10,000,000		..	..		1/1,000	Uncountable 1/1,000
					1/50,000			1/10,000	
Staph. aureus ..	Dried serum, normal concentration	2	1,800,000		No growth			No growth	
		7	10,500,000		..			..	
B. subtilis	.. ..	2	28,000		..			..	
		7	175,000		..			..	
Enterococcus	.. ..	2	210,000,000		115,000			..	
		7	20,000,000					..	
					1/50,000		1/10,000		
Staph. aureus	Citrated plasma	3	10,500	No growth	No growth		No growth	No growth	No growth
		8	8,300,000	10,000,000 (?)	..		..	..	..
B. subtilis	.. ..	3	No growth	No growth	..		..	..	..
		8	Profuse growth	..	..		..	..	..
Enterococcus	..	3	1,900,000,000	Uncountable 1/1,000	Uncountable 1/1,000		Uncountable 1/1,000	..	..
		8	48,000,000					..	..

and phenyl mercuric acetate, so that the final concentration was 1/10,000. Growth of the organism could be demonstrated in three days at room temperature. Apparently none of these disinfectants will control the growth of pseudomonas.

Effect on Moulds.—The inhibitory effect of proflavine and phenyl mercuric nitrate on moulds was tried in one experiment. A series of half dilutions of disinfectants was made in reconstituted dried serum from 1/10,000 to 1/160,000, and these were inoculated with a small amount of the vegetative form of an air-borne mould growing in serum broth. At room temperature growth took place in all dilutions of the serum containing proflavine, but was inhibited by 1/80,000 phenyl mercuric nitrate. There was no apparent difference in the tubes containing proflavine and in the controls.

Effect of Sulphanilamide in Serum and Blood.—Because of our inability to repeat the results of Novak (1939) one experiment was carried out on the lines suggested by Novak and Hunwicke (1940). Into twelve tubes 40 c.cm. of sterile citrated human blood was measured. Four were inoculated with a saline suspension of *B. subtilis*, four with *M. tetragenus*, and four more with *Ps. pyocyanea*. The suspensions were so adjusted that the blood contained 20 organisms per c.cm. Two tubes of each group were kept as a control, and to the others sulphanilamide was added, the final concentration being 1/5,000. One of each of the tubes containing organism and sulphanilamide, and its appropriate control, were held at room temperature, and the second set at 4° C. The blood was tested for bacterial growth after four days and seventeen days by smearing a loopful on the surface of an agar plate. After thirty days' incubation poured plates were made, those of the blood held at 4° C. with 1 c.cm., those held at room temperature with 0.1 c.cm. After four days at room temperature evidence of growth was obtained in the control tube containing *B. subtilis*, and after seventeen days growth in the tube containing *M. tetragenus* and *Ps. pyocyanea* was demonstrated. The plates poured after thirty days showed profuse growth of the bacteria in all tubes, and there was no obvious difference between those which contained sulphanilamide and the controls. With the exception of the control tube containing *Ps. pyocyanea* there was no growth in any of the tubes held at 4° C. After fifty-four days these tubes were incubated at 37° C. for three days and plates poured, using 1 c.cm. of blood as an inoculum. Profuse growth was observed in the plates from the control tubes, but there was no growth in any tube which contained sulphanilamide. Except that no growth of the controls could be shown at 4° C., these results corroborate those reported by Novak and Hunwicke.

Conclusions

As had been expected from Fildes's (1940) work the bacteriostatic power of mercurial disinfectants was considerably less in serum than in other media. Birkhaug (1930) has reported that metaphen in serum broth will destroy *Staph. aureus* in a dilution of 1/120,000. In serum a dilution of 1/80,000 allowed definite bacterial growth, and 1/40,000 proved only bacteriostatic—that is, bacteria would grow when the serum was diluted.

The efficacy of the individual disinfectants tried in these experiments appeared to depend entirely on the contaminating organism. *Metaphen* in a dilution of 1/10,000 inhibited the growth for six days of *Staph. aureus* and *B. subtilis* in serum, but enterococcus and *Ps. pyocyanea* grew in this concentration. Metaphen is soluble in dilute alkali (*p*H 9) in a concentration of 1/500, and does not affect the physical nature of the serum (Birkhaug, 1934; Hirschfelder and Wright, 1930). Bernstine (1929) has reported the intravenous injection of 10 mg. of metaphen without toxic effects. It will be observed, however, that the transfusion of 1 litre of serum would involve the injection of 100 mg. of the disinfectant.

Merthiolate had an activity of the same order as metaphen, except that no growth of enterococcus could be demonstrated in six days with a dilution of 1/10,000. This dilution did not prevent the growth of *Ps. pyocyanea*. Merthiolate is relatively non-toxic, and does not affect serum proteins (Powell and Jamieson, 1931).

Phenyl mercuric nitrate was effective against *Staph. aureus* and *B. subtilis* in a dilution of 1/50,000, but this dilution did not prevent the growth of enterococcus after six days, and 1/10,000 had no effect on the growth of *Ps. pyocyanea*. The growth of mould was inhibited by 1/80,000. The *p*H of the medium did not affect the bacteriostatic powers of this disinfectant. Drying the serum in the presence of 1/10,000 phenyl mercuric nitrate had no effect on the osmotic pressure after reconstitution (Adair, personal communication). Phenyl mercuric nitrate is reported to be less toxic than metaphen, which contains the same amount of mercury (Birkhaug, 1930). The chief objection to the use of this disinfectant is its insolubility in water, a saturated solution containing only 0.79 gramme per litre.

Phenyl mercuric acetate was tried because it was more soluble and would appear to be effective in a concentration of 1/100,000; but this concentration precipitated serum proteins.

Proflavine 1/100,000 prevented growth of *Staph. aureus* and *B. subtilis* for six days and enterococcus for three days. A concentration of 1/10,000 did not prevent the growth of moulds or of *Ps. pyocyanea*. Eggerth's (1926) observations on the effect of the hydrogen-ion concentration could not be repeated ; proflavine was as active in plasma at a *p*H of 6.9 as in serum at a *p*H of 8.4.

Sulphanilamide proved ineffective in serum and plasma in inhibiting bacterial growth. Novak (1939) and Hunwicke (1940) have reported that 1/5,000 sulphanilamide would prevent the growth of organisms in stored citrated blood for twenty-one days. In serum from an inoculum of 20 organisms per c.cm. there is no growth of *Staph. aureus, B subtilis, M. tetragenus*, or enterococci for twenty-four hours after incubation at 37° C.; but after this time growth of all these organisms was observed and the degree of inhibition depended on the organisms. Enterococci and micrococci grew readily at 37° C., the count of micrococci increasing from 4,150 bacteria per c.cm. in two days to 53,600,000 in seven days. Control counts on serum without sulphanilamide during the same period showed a count of 466,500,000 in two days and 54,500,000 in seven days. At 4° C. serum which had become contaminated with *M. tetragenus* and had an initial count of 200 organisms per c.cm., after three days in the presence of sulphanilamide contained 5,500 organisms per c.cm., and after six days contained 45,000 bacteria per c.cm. Counts on serum without sulphanilamide increased from 4,350 bacteria per c.cm. in three days to 45,000 in six days. This serum had been held for some months at −20° C. Growth of *Staph. aureus* was inhibited to some extent by sulphanilamide. In serum inoculated with 20 organisms per c.cm. and incubated at 37° C. the count after two days was 24,000,000 organisms per c.cm. and 91,500,000 after seven days. Serum containing 1/5,000 sulphanilamide under similar conditions had a bacterial count of 9,000 bacteria per c.cm. in two days and 2,900,000 in seven days. It would appear, therefore, that sulphanilamide will inhibit the growth of organisms in serum for twenty-four hours but cannot be relied on for any longer period.

The results obtained when using citrated whole blood as a growth medium for the bacteria substantiate those previously described by Novak in human blood and by Hunwicke in horse and guinea-pig blood.

Thymol and *P-chlor-m-cresol* were shown to be quite unsuitable as serum preservatives: both allowed the growth of organisms in a dilution of 1/2,000, and caused the precipitation of serum protein.

Discussion

From these experiments it would appear that disinfectants can have only a limited value in controlling the bacterial growth in stored serum. Of those tried the most effective was proflavine. In a concentration of 1/100,000 it prevented the growth of *Staph. aureus* and *B. subtilis* for six days and of enterococcus for three days. A dilution of 1/10,000 had no effect on *Ps. pyocyanea* or mould. From recent work (Albert *et al.*, 1938) it is evident that much higher concentrations are equally ineffective against pseudomonas. Higher concentrations of any of these disinfectants would not be practicable because of the danger of toxic reactions.

Bottles of serum sent by the Emergency Blood Supply Depots of the London region for drying in this laboratory

have been tested for sterility as they were received, and the results of these tests have been reported back to the depots. Some of the bottles have been found to be contaminated, and the number has steadily decreased as the depots have gained experience in the separation of the serum. As in no case was there any evidence of gross infection, and as the bottles are held at 4° C., at which temperature bacterial growth is slight, the infected bottles were pooled with the sterile ones during filtration. The majority of the contaminants were spore-bearing aerobes of the *subtilis* type, and Gram-positive cocci—either micrococci or sarcinae; pseudomonas was also isolated from serum and from stored citrated plasma. The necessity for filtration is evident, and from experimental results it is also evident that, although the contaminants of the *subtilis* type would be susceptible to the action of disinfectant, the Gram-positive cocci and pseudomonas would be resistant to its action, and the value of adding disinfectant to serum is doubtful.

While it is obvious that the correct procedure is to maintain conditions of absolute sterility during both the preparation and the solution of dried serum, and that the reconstituted serum should be used immediately, it is possible that in wartime reconstitution might take place under difficult conditions and it might not be possible to use the serum immediately. In such circumstances results would indicate that proflavine 1/100,000 and phenyl mercuric nitrate 1/50,000 would prevent bacterial growth for three days.

Summary

The effect of various disinfectants in controlling the growth of bacteria in serum, dried and reconstituted serum, and citrate plasma has been studied.

Growth of *B. subtilis* and *Staph. aureus* was prevented for six days by merthiolate 1/10,000, metaphen 1/10,000, phenyl mercuric nitrate 1/50,000, and proflavine 1/100,000. Growth occurred in sulphanilamide 1/5,000 after twenty-four hours.

Enterococcus was inhibited for three days by phenyl mercuric acetate 1/100,000, proflavine 1/100,000, and merthiolate 1/10,000. Growth in three days could be demonstrated in the presence of metaphen 1/10,000, phenyl mercuric nitrate 1/50,000, and sulphanilamide 1/5,000.

Ps. pyocyanea was not inhibited by any of these disinfectants.

Thymol and *p*-chlor-*m*-cresol were ineffective as bacteriostatics; and these and phenyl mercuric acetate precipitated proteins in serum.

Freezing at −20° C. and drying in serum did not affect the bacteriostatic power of metaphen, sulphanilamide, proflavine, and phenyl mercuric nitrate; nor did the presence of the disinfectants affect the solubility of the dried serum.

Moulds were inhibited by 1/50,000 phenyl mercuric nitrate but not by 1/10,000 proflavine.

Sulphanilamide will prevent the growth of *B. subtilis*, *M. tetragenus*, and pseudomonas in whole blood for thirty days at 4° C. but not at 22° C.

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The Foreign Department of the Reich Students' Administration announces (*Klin. Wsch.*, 1940, **19**, 1296) that more than 3,300 foreign students of both sexes are now enrolled in German universities. It is stated that no fewer than 65 countries of the world have sent delegates from their student youth to study in Germany.

LACTOSE FOR PREVENTION OF ODOUR IN THE CLOSED-CAST TREATMENT OF COMPOUND FRACTURES

BY

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The increasing use of the closed-cast method of treating compound fractures, particularly under wartime conditions, induces us to propose a means of preventing the foul odour that is one of its principal disadvantages. Our procedure, of which a more detailed account will be published elsewhere, has been devised in connexion with the treatment of osteomyelitis by the Winnett Orr technique. The application of that method to compound fractures has been well described by Trueta (1939).

Protein-sparing Effect of Carbohydrate

Briefly stated, it is our hypothesis that the foul odour which develops in these casts is the result of putrefaction, defined by Rettger (1928) as "anaerobic decomposition of protein with the formation of foul-smelling products characteristic of cadaveric decomposition." Autolysis of devitalized tissue probably helps to initiate this proteolysis by providing preliminary breakdown products which are more readily attacked by micro-organisms than are native tissue proteins. It seems likely that anaerobic bacteria play an important part in putrefaction. Trueta (1939) has noted the presence of anaerobes in the wounds under consideration. Whether these organisms arrive through the blood stream or by accidental implantation remains to be determined. On the basis of these assumptions, by implanting a sugar in the wound one may take advantage of the fact that most bacteria will attack carbohydrate in preference to protein when both are simultaneously available. As Kendall *et al.* (1913) have expressed it: "Fermentation takes precedence over putrefaction." It is when bacteria are utilizing protein for fuel rather than for merely structural requirements that foul products are formed. This principle is commonly referred to as the "protein-sparing effect of carbohydrate."

In selecting a sugar for use in wounds lactose was chosen instead of glucose because, since its molecule is larger (Kendall and others, 1913), a solution of it isotonic with the blood contains more sugar, and (Kendall, 1923) loss by absorption from the wound should be less. Since the first stage in the fermentation of lactose is the production of galactose and glucose, the latter becomes available for the relatively few organisms which cannot utilize lactose.

Method of Using Lactose

For clinical use we have arbitrarily chosen a 12% solution. Lactose of *U.S.P.* grade is dissolved in distilled water and autoclaved in quantities of about 50 c.cm. Sterile gauze dressings which have been dipped in this solution are placed in the wound instead of the usual vaselined gauze packs. A covering of dry gauze is employed to keep the sugar from contact with the plaster lest crumbling occur. In débridement the solution should be made and autoclaved within two hours of the time the water is distilled, as a precaution against the presence of spores. At subsequent re-dressings this precaution is unnecessary, since the granulation tissue is an adequate barrier against toxins (White, 1931).

We have employed this method in Winnett Orr casts for periods up to four weeks without the development of

a definite odour of putrefaction. For longer periods it is possible that larger amounts of sugar may be needed. These could be provided by increasing the concentration of the solution or by adding crystalline lactose to the dressings. With the use of lactose both the amount of exudate and the tendency to excoriation of the surrounding skin appear to be diminished, probably because bacterial production of proteolytic enzymes is decreased in the presence of utilizable carbohydrate (Kendall, 1923). The usual healing process does not seem to be impaired by the addition of sugar. The dressings do not become adherent to the wound as is sometimes the case with vaselined gauze. Since *B. pyocyaneus* has little or no ability to utilize sugar this method does not affect its odour, which, however, is not nearly so offensive and penetrating as that of true putrefaction.

It is to be hoped that the use of lactose will prove as satisfactory in compound fractures as it has in osteomyelitis.

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ACUTE DILATATION OF THE STOMACH

BY

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It is our intention, as the result of an unusual case of acute dilatation of the stomach, to discuss briefly the current views on this condition. Acute dilatation was described first by Kundradt in 1871, and was soon recognized and commented upon by other people (Fagge, 1873; Rokitansky, 1861). Rokitansky suggested that it was caused by the dragging of the mesentery of the small intestine, which pressed upon and occluded the transverse portion of the duodenum. This theory has persisted till recently, but it is surprising to find it still in modern textbooks. It is difficult to conceive how the occlusion of the duodenum can bring about acute dilatation of the stomach when the case described below is considered. Most of the reported cases follow operations, but there are many accounts of the disease arising apart from operation—e.g., during a severe wasting disease (Herrick, 1906)—and the condition has been known to occur in healthy individuals as the result of overeating (Gillette, 1930). It has also been reported following childbirth and severe blows to the abdomen.

Dragstedt and others (1931) state that acute dilatation is rare after operations upon the stomach itself, and we have considered it noteworthy to report a case following an operation of partial gastrectomy, as no such case could be found in the literature.

There are many peculiarities in respect of acute dilatation. The first striking feature is the enormous amount of fluid from the stomach: where does it come from? One opinion is that the stomach is able to hold all this fluid because it has become paralysed as the result of reflex sympathetic stimulation. The suggestion has been put forward (Morris, 1882-3) that the enormous amount of fluid was the result of excessive secretion of the stomach mucosa—in other words, a gastrorrhoea. Certain factors discountenance this theory. For instance, in our own case, in which a large part of the stomach had been removed, it is difficult to understand how the remaining portion could secrete 8½ pints in twenty-four hours. Again, if the fluid aspirated or regurgitated came from the stomach alone it would contain hydrochloric acid, but examinations of the fluid show it to contain little or no free HCl. It always contains bile (Herrick, 1906; Dragstedt and Dragstedt, 1922).

The present-day view considers that the dilatation is neurogenic and is the result of paresis of the muscles of the stomach. We suggest that the enormous amounts of fluid collecting in these cases arise from the alimentary canal below. As the result of the stomach becoming paralysed and dilated a negative pressure is produced in its interior. The intra-alimentary pressure where the muscular tonus is normal is higher than the intragastric pressure, and fluid flows backwards into the stomach—in other words, there is a backwash. The fluid keeps on collecting, and when enough is present it wells up into the oesophagus, rises into the pharynx, and is eventually expelled. This theory is supported by the fact that in these cases there is actually no true vomiting. The fluid which comes away just pours out from the patient's mouth. There is no sign of its being discharged in an expulsive manner. Once the condition has been started it is easy to understand why it should continue and how quickly the patient loses fluid. Not only fluid is lost but also valuable substances which are absorbed naturally lower down in the intestine and which are essential to retain the normal equilibrium of the blood. It is the loss of these valuable substances from the blood stream that is the real cause of death in these cases. There is no doubt that after operations acute dilatation of the stomach is of frequent occurrence in minor degrees, just as paralytic ileus is. It is difficult to understand why some cases should develop acute dilatation and others paralytic ileus. Fortunately these minor cases tend to right themselves. Factors which may make one suspicious that acute dilatation (or paralytic ileus) is developing are that the pulse rate is not lessening as expected after an operation, or that it is rising after having been lower for a short while. Or, again, the patient may complain of being uncomfortable under the bandages or show some uneasiness in his epigastric region. These cases should be met by passing a duodenal tube and leaving it in. This process of "sounding the stomach" is of the greatest assistance.

Case Report

The patient, a thin man aged 64, gave a history of abdominal pain in relation to meals for the last twenty years. He had noticed recently that his stools were often tarry. For the past six to twelve months vomiting had become more frequent and of greater volume; it relieved pain. A barium meal revealed great delay in emptying time. Gastroscopic examination showed chronic gastritis and pyloric stenosis, but no ulcer was seen. Occult blood ++ was found in the stools. A test meal disclosed a very high content of free acid.

The patient has had extensive medical treatment at other places, but without improvement. On January 31, 1941, a partial gastrectomy under spinal anaesthesia and gas-and-oxygen was carried out. A large-sized duodenal ulcer was seen. At the end of the operation the patient's condition was satisfactory: the pulse had fallen from 120 to 96. Twenty hours after the operation the pulse rate began to rise slowly, though the patient was comfortable and did not complain of symptoms. Thirty hours after operation the pulse rate had risen to 120 and he had a feeling of distension in the epigastrium. At this time he spat out 2 oz. of dark brown fluid which he said "just came up into my mouth." Acute dilatation was suspected, and the stomach was sounded by means of a Ryle tube. 30 oz. of fluid was aspirated. A continuous gastric drainage apparatus was set up and an intravenous drip was started. Morphine grain 1/4 four-hourly was administered, and the bed was raised two feet at the bottom. Within twenty-four hours from beginning the aspiration 8½ pints of fluid were withdrawn and the pulse came down to 86.

Summary and Conclusions

A case of acute dilatation of the stomach following a partial gastrectomy is described. In view of this condition following a partial gastrectomy the previous theory of compression of the third part of the duodenum by the mesentery is proved to be wrong.

The present theory that acute dilatation is neurogenic in origin is one which is now accepted. We have come to consider that this condition and paralytic ileus are very closely related, the only difference being that one is a pathological state of the stomach and the other a pathological state of the alimentary canal lower down. A theory as to the origin of the large amount of fluid expelled is given.

The value of "sounding the stomach" in the early stages of the condition is stressed.

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Clinical Memoranda

Capillary Fragility and Vitamin C in 40 Children of Different Classes

By dietary experiments on a man and a woman whose capillary resistance to rupture was initially normal Göthlin (1937) was able to show that subsistence on a diet poor in vitamin C gradually gives rise to capillary fragility. The change proved to be reversible, for with increasing doses of fresh orange juice the strength of the cutaneous capillaries returned to normal. In 1931 Göthlin found that 5.9 to 21.5% of his children gave a positive capillary resistance reaction. In all cases their diets were deficient in vitamin C. He gave these children 60 to 120 c.cm. of orange juice a day, and yet only 50% of them showed any definite rise of capillary resistance. From this he concluded that although lack of vitamin C was a definite factor in lowering the capillary resistance there were other factors to be considered. In 1935 Dalldorf and Russell investigated a series of 24 persons with subclinical scurvy. They injected 100 mg. of ascorbic acid in 21 cases and 50 mg. in 3 cases. All showed an immediate rise of capillary resistance between 10 and 20 mm. Hg, using Dalldorf's technique. Since then St. Rusznyák and Szent-Györgyi (1936), and Scarborough and Stewart (1936) have suggested that vitamin P (hesperidin) was responsible for increased capillary fragility; but that has been disputed by Zilva (1937).

The Investigation

To discover the relation of capillary resistance to vitamin C and to investigate this difference in various social groups we studied the capillary fragility of 40 unselected healthy children. The method adopted was a modification of Bell, Lazarus, and Munro's (1940) adaptation of Göthlin's test. This modification was necessitated by the small size of the children's arms. A circle 6 cm. in diameter was made on the anterior cubital fossa; the skin on the area was examined, and any blemish resembling petechiae was marked on the skin. The subject was seated in a chair with the arms resting on a table at the level of the heart. The longitudinally folded band of a sphygmomanometer was wrapped round the upper arm, the lower edge of the bag being kept at least half an inch above the circle. Pressure of 50 mm. Hg was maintained for fifteen minutes. After the skin had returned to its normal colour petechiae in the circle were counted by each of us independently, and the average taken. A 300-watt lamp, two feet from the arm, was used for the inspection of the cubital fossa, and the room was kept at a comfortable temperature. Several of the normal children were tested on two separate occasions, but the results at both times were practically identical.

As Göthlin (1931) and Bell *et al.* (1940) have shown, over eight petechiae in the circle represent a definite increase in capillary fragility.

Results.—A total of 40 unselected healthy children between the ages of 1½ and 6 years were examined. Class A were 10 children from a private school; Class B were 20 children from the poor quarters of Newcastle-upon-Tyne; and Class C 10 children from a day nursery. Therefore the nutrition of Class A could be considered as excellent, of Class B poor, and of Class C intermediate, as the children of this class obtained better food than Class B whenever they attended the day nursery.

TABLE I.—*Distribution of Children according to Number of Petechiae in the Circle shown at the First Test*

	No. of Petechiae												
	2	3	4	5	6	7	8	9	10	11	12	13	14
Class A (10)	—	2	1	4	1	1	1						
,, B (20)	1	1	2	2	2	3	3	2	—	—	2	1	1
,, C (10)	1	3	1	1	2	—	—	—	2				
Total (40).. ..	2	6	4	7	5	4	4	2	2	—	2	1	1

TABLE II.—*Result of Administration of Ascorbic Acid in the 8 Children with Initial Increased Capillary Fragility*

Initial Petechial Count	Petechial Count After Treatment for 1 Week	Petechial Count After Treatment for 2 Weeks
13	4	—
14	11	7
9	6	—
12	4	—
12	5	—
9	4	—
10	5	—
10	4	—

Table I shows that 8 of the 40 healthy children had a definite increase in fragility of the capillaries. These 8 children were re-examined for capillary fragility after the administration of 100 mg. of ascorbic acid (redoxon) daily for a period of one week. Table II shows that after the administration of ascorbic acid all the 8 children were definitely improved, the capillary resistance being normal to 7 out of 8. To the one child who still had abnormal fragility, ascorbic acid 100 mg. daily was given for a second week, after which she showed normal capillary resistance. All children of Class A had normal capillary resistance; while in 33% of Class B and 25% of Class C it was definitely increased.

Discussion

This series shows that capillary resistance to pressure is greatly affected by vitamin C, and that the abnormal fragility of the capillaries can be improved by the administration of ascorbic acid in sufficient doses. The capillary resistance is normal in healthy children of the better classes, and it decreases as the diet deteriorates. This fact may suggest that nutrition, and probably vitamin C, play an important part in capillary fragility.

If the capillary resistance test can be considered to be an index of the amount of vitamin C sufficiency or deficiency in the healthy children, then our results compare favourably with the findings of Prof. Harris (1940) in Cambridge children, as determined by his methods of urine analysis. The capillary resistance test may therefore have great scope in the assessment of adequacy in routine school medical examinations.

We are grateful to Dr. A. J. Smith for his generous help in this work.

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Reviews

CAUSAL MECHANISMS OF DEVELOPMENT

Organisers and Genes. By C. H. Waddington, Sc.D. (Pp. 160. 12s. 6d. net.) Cambridge: The University Press. 1940.

For at least twenty years the need has been felt for a synthesis of the results of genetic and embryological experiments. Genetics alone remains formal, a science of ratios, a schematic representation of certain aspects of reproduction and hereditary transmission. Embryology alone remains, for the most part, descriptive, lacking the fabric of ordered hypothesis and theory. The present book will therefore be welcomed as a praiseworthy effort to present "a general framework for our ideas on the causal mechanisms of development." The aspect of embryology particularly considered is that of embryonic induction, about which knowledge has increased rapidly in recent years; a field, moreover, in which Dr. Waddington has himself made notable contributions. The reader who is unfamiliar with this subject will find himself on ground which is far from easy, and may at first feel bewildered by the complexities of evocation, individuation, competence, and the like. Similarly, the reader whose knowledge of genetics is slight will face a stiff task, though here, too, the argument, if closely reasoned and condensed, is clear. Careful reading is required, but will repay the effort. Many will doubtless feel some disappointment that more has not been accomplished, that more cannot be said. It should be emphasized, however, that the fault, if it is a fault, is not that of the author. He has presented a thoroughly able thesis, and one which is complete and up to date. A synthesis has been attempted, and with success, but it is clear that, if the foundations have been truly laid, future years will see much greater advances than those already made.

The reader is urged not to look at the frontispiece, entitled "The Epigenetic Landscape," till he has read page 93. We had no one to give us this advice, and kept turning back only to be baffled again and again; and to be reminded of some lines of unhappy inspiration that once called down the thunderbolts of Macaulay:

> "The soul, aspiring, pants its source to mount,
> As streams meander level with their fount."

After all this the sentence on page 93, "It would be difficult to find a similar configuration in any actual piece of country," seemed a masterpiece of understatement. If the reader, however, curbs his impatience he will be rewarded with a not unhelpful similitude and will spare himself, as we did not, a considerable headache.

GASTRIC AND DUODENAL ULCERS

Gastric and Duodenal Ulcers. By Harold Avery, D.Sc., M.B., M.R.C.P. (Pp. 110; illustrated. 7s. 6d. net.) London: John Bale and Staples, Ltd. 1941.

This book, according to the author, was written because of the difficulty of finding concise information on the subject of gastric and duodenal ulcer in a single volume. Unfortunately, the fifty-three small pages in the book which are devoted to symptoms, diagnosis, and treatment give no more satisfactory information than that provided by several textbooks on general medicine. There are neither references nor bibliography—a serious omission from a monograph, however small.

The book opens with a badly illustrated account of the anatomy and physiology of the stomach. This is followed by a short chapter on the pathology of ulcer, illustrated by four deplorable sketches. After an account of the aetiology a short description of the clinical history is given. The chapter on clinical examination, including radiology, is accompanied by only two radiographs, neither of which is very good. The chemical, but not the more accurate spectroscopic, methods of examining for occult blood are described, and the necessity for eliminating chlorophyll from the diet is not mentioned.

Dr. Avery does not appear to have any decided views on the subject of treatment. He gives prescriptions for three different alkaline powders without indicating under what conditions each should be used. The dose of tinct. belladonnae is given as 5 minims, which is too small to have any effect on secretion or motility in the majority of cases, and the hypodermic injection of grain 1/75 of atropine at night is recommended, though atropine can be equally well given by mouth. The author has an unfortunate liking for proprietary preparations of doubtful value, and he recommends the quite unnecessary addition of copper and manganese to iron in the treatment of anaemia. The advice that transfusion should be given, in cases of haemorrhage requiring surgery, only after the bleeding-point has been secured will not be shared by many surgeons, who naturally prefer that the patient's haemoglobin should be brought to a safe level before beginning the operation.

In discussing hour-glass contraction the four physical signs collected by Moynihan in 1904 are described, although in practice they were found useless in the days before the *x* rays rendered the search for signs superfluous. Dr. Avery states that blood from a duodenal ulcer is rarely vomited—an extraordinary statement in view of the fact that duodenal ulcer is the commonest of all causes of haematemesis.

THE EYE IN MEDICO-LEGAL PRACTICE

A Treatise on Medicolegal Ophthalmology. By Albert C. Snell, M.D. (Pp. 312. 30s. net.) St. Louis: The C. V. Mosby Company. 1940.

No monograph has been published in this country on the medico-legal relations of the ophthalmologist; and indeed the general practitioner of medicine or law might find it difficult to imagine what would fill a fair-sized book on this subject. He might guess correctly that the matter would practically all be concerned, directly or indirectly, with compensation, chiefly of injured workmen and secondarily of persons injured by negligence or malice, or of candidates for pensions. Even in that restricted field Dr. Snell shows how large the subject is. His first three chapters, it is true, deal with general law—the position of the medical witness, the legal duties of a physician, and the law relating to negligence. He also traces the historical development of liability and compensation laws in America, and the laws relating to vision which have been passed both by the Federal legislature and by the various States. The middle section of the book, which is his individual contribution to the science of forensic ophthalmology and perhaps its most important part, deals with the evaluation of visual disabilities and the determination of fractional parts of vision. Acuity notations, of course, are not expressions of fractional parts of vision, and the fractional form of recording acuity of vision devised by Herman Snellen in 1862 and now in universal use does not represent the remaining fraction of the normal vision.

Dr. Snell summarizes the various attempts that have been made to estimate visual function and points out their drawbacks. The problem has been extensively studied in the United States, especially by the Section of Ophthalmology of the American Medical Association, and Dr. Snell reprints the report of its committee on compensation for eye injuries. This sets forth a method of appraisal

of visual efficiency which has been accepted as a standard by nearly all American ophthalmologists, and he recommends its more general use in order to secure a greater degree of uniformity among the various States in computing indemnity for visual disability. Other chapters of this elaborate study are devoted to examination of injured eyes, malingering, and suggestions for the improvement of the compensation laws. For the English reader about half this book is irrelevant, as it deals with American law and procedure. The other half, however, is obviously of great value. The workmen's compensation laws of the two countries are sufficiently alike to make the general practical purpose of the book applicable here, and the medical rather than the legal side should greatly assist ophthalmologists who have much insurance practice.

COMMUNITY HYGIENE

Community Hygiene. By Elizabeth Sterling Soule, R.N., M.A., and Christine Mackenzie, R.N., M.A. (Pp. 218. 7s. 6d. net.) New York: The Macmillan Company. 1941.

Professor Elizabeth Soule and Instructress Christine Mackenzie of the University of Washington present in their recently issued book entitled *Community Hygiene* a brief but well-informed survey of public health activities in the United States to-day. Among the chapter headings are Food Control, Water Supply, Sewage Disposal, Housing, Communicable Diseases, Maternity, Infancy and Childhood, and Industrial Hygiene. We have found no errors in what is said, and no omission of significance. The important points are well brought out, and the style of writing is lucid and graceful. Though it modestly claims to be but a manual for student nurses at Washington, *Community Hygiene* is well worthy of a wider circle of readers, even including students and practitioners of medicine on this side of the Atlantic, many of whom might derive an enhanced appreciation of the aims and achievements of hygiene from this pleasant book.

Notes on Books

The ninth edition of *Bainbridge and Menzies' Essentials of Physiology*, edited by H. Hartridge, M.D., F.R.S., is published by Longmans, Green and Co. at 16s. This book is popular with students on account of its small bulk. On that account also its style is brief to the point of dreariness. Much recent matter has been included in the present edition, but some obsolete matter is still to be found, and certain important new items have been omitted. For instance, under the functions of the adrenals, the now discarded view of the failure of respiration after adrenalectomy is not only mentioned but supported by a figure in the text. Yet under the same heading there is no mention of the now well recognized and clinically employed cortical steroids. Misspellings, such as that of " phosphorelation " for " phosphorylation " on the same page, are frequent (e.g., " odenyl " for "adenyl" on p. 543). There are numerous instances of loose or inaccurate statements throughout the book, and most of these are to be attributed to the extreme compression to which the matter has been subjected. Some new figures have been introduced, and these are clearly drawn ; it is a pity there are not more of them, and either a less ambitious text or a fuller exposition throughout. The general get-up of the work is excellent, and the index adequate.

Modern Treatment in General Practice Year Book 1941 is edited by Mr. CECIL P. G. WAKELEY, who writes a preface, and it is a collection of short miscellaneous papers on therapeutics reprinted from the *Medical Press and Circular*, which publishes the volume at 12s. 6d. from the office of Baillière, Tindall and Cox. The first and larger part of the book is made up of thirty-one signed contributions on subjects ranging from haematemesis to dental cysts. The concluding section comprises twelve signed articles grouped together under the heading " War Medicine and Surgery." Some of the articles are illustrated, and there is an index.

Mr. ALECK BOURNE'S *Synopsis of Obstetrics and Gynaecology*, first published in 1913, has now reached an eighth edition (John Wright and Sons, Ltd., 15s.). The general plan is maintained, but the text has undergone a good deal of revision and some parts have been largely rewritten. There is a new section on post-natal care. In his preface the author expresses the hope that this book may still be helpful to students for revision and to practitioners as a means for quick reference. We think it will.

Preparations and Appliances

TROCAR FOR INTRODUCING REINFORCED MALECOT OR DE PEZZA TUBE THROUGH THE BLADDER WALL

Mr. H. P. WINSBURY-WHITE, F.R.C.S. (London, W.1) writes:

The trocar illustrated herewith is really a modification of the instrument made some years ago for the late Frank Kidd. The point of the trocar is passed down the tube and made to perforate the central reinforced button at the vesical end of the former. After the distended bladder has been exposed

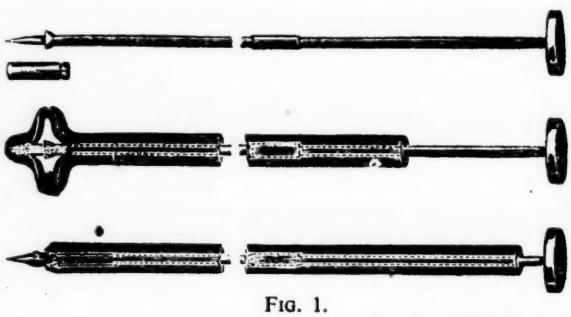

FIG. 1.

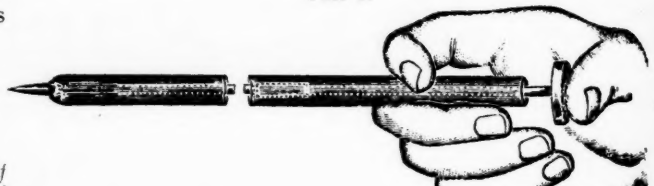

FIG. 2.

the tube is put on the stretch with the fingers and thumb as shown in Fig. 2. The point of the trocar and adjacent part of the tube are then forced firmly through the exposed bladder wall. The trocar is next quickly withdrawn while the tube is held securely just outside of the bladder. This form of trocar can be disengaged from the tube more quickly than the old pattern instrument; thus a minimum amount of fluid is allowed to escape.

If gradual decompression of the bladder is necessary, the tube is spigoted as soon as the trocar is withdrawn. As the tube is on the stretch when it is introduced, it re-expands the moment it is released and in this way makes a completely watertight junction with the bladder wall, so bringing decompression under complete control. Because of its length the trocar is made in two equal parts which unscrew for convenience in travelling and sterilizing.

The instrument has been made for me by the Genito-Urinary Manufacturing Company of London.

ASCORBIC ACID FOR INFANTS

British Drug Houses Ltd. now supply tablets of vitamin C for infants, so as to provide ascorbic acid in a convenient form and thus counter the shortage of oranges. Each tablet contains 5 mg. of pure vitamin C and is equivalent to about two teaspoonfuls of orange juice. It dissolves readily in warm milk or in the infant's feed. The tablets are put up in bottles of fifty.

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NOTICE TO READERS

To-day's issue of the BRITISH MEDICAL JOURNAL *has been prepared and passed for press under conditions of very great difficulty brought about by exigencies of war. Readers and contributors are asked to overlook imperfections in the* JOURNAL *as now printed in a different type-face, and to understand that much current material is perforce missing.*

It may now be stated that British Medical Association House suffered severe damage in one of the recent air raids on London; but work continues in all the departments.

ENDOCRINE INTERACTIONS

When Claude Bernard, from his study of the glycogenic function of the liver, first formulated the conception of internal secretion as a process by which the constancy of the internal environment was ensured, the real profundity of his generalization was not fully appreciated. Yet every subsequent advance in endocrinology has borne it out, and Dr. W. Cramer[1] has reviewed and added to our knowledge of this balance. He regards the endocrine glands as functionally one system consisting of a number of interacting units, in much the same way as Aschoff regarded various groups of cells in different organs as forming a coherent reticulo-endothelial system. The former is, however, much more varied in its responses, for some of its members are synergists and others are antagonists. If one of these glands is stimulated the internal environment is altered, and in order to restore the balance there is a secondary compensatory response in other glands, the antagonists being stimulated and the synergists inhibited. When the primary change is an inhibition or dysfunction the compensatory response is in the reverse direction—that is, antagonists are inhibited and synergists stimulated.

After showing how completely this idea is exemplified by recent knowledge concerning the classical example—that of the glycogenic function of the liver—Dr. Cramer goes on to elaborate it in connexion with the sex hormones. Prolonged experimental oestrinization gradually induces a syndrome resembling Simmonds's disease, yet the anterior pituitary is enlarged and deeply congested, while histologically it approaches the appearance of a chromophobe adenoma. This can be explained only by the supposition that the oestrogen arouses the anterior pituitary to a compensatory reaction which it nevertheless antagonizes and overcomes. That this is the true explanation is shown by the failure of the Simmonds syndrome to appear if oestrogenic and anterior pituitary hormones are injected simultaneously. On the other hand, the effect on the adrenal cortex of prolonged oestrinization is a specific degeneration of the innermost zone of the cortex, which on the view that the ovary and the adrenal cortex are synergists is what would be expected. It is further supported by the fact that if oestrinization is started a few weeks before adrenalectomy is performed in mice the mortality after operation is greatly diminished. Moreover, Woolley and others[2] found that spayed mice developed massive hyperplasia of the adrenal cortex. Thus hyperfunction of one gland leads to hypofunction of its synergists, and vice versa. On similar lines he attributes status lymphaticus to adrenocortical hypofunction. The adrenal medulla, though much less active in this connexion, appears to be antagonistic both to its own cortex and to the ovary. Cramer develops an interesting speculation based on these observations as to the influence of the synergist ovary and adrenal cortex on the development of mammary cancer, and of the antagonist anterior pituitary and adrenal medulla on mammary involution. He maintains, however, that the therapeutic value of the oestrogenic hormones is so high that their use should not be discredited on this account, as there is no risk of inducing cancer thereby so long as they are given over short periods of several months in doses just sufficient to produce the desired therapeutic effect. From a study of its effects on other glands he is of opinion that the follicular hormone embraces a wider range of endocrine activities than that of any other single hormone, in which respect it is in striking contrast with the male hormone testosterone, in spite of the close chemical similarity between them. An excessive supply of testosterone does not produce any of the effects on the pituitary and adrenal cortex which can be induced by very small doses of oestradiol, though, on the other hand, castration leads to some degeneration in the anterior pituitary (which disappears when testosterone is given) and degeneration in the adrenal medulla.

Dr. Cramer will not allow that the anterior pituitary is "the leader of the endocrine orchestra,"[3] considering that the pituitary is deeply influenced by the female member of that orchestra. (Presumably, then, the pituitary is more independent in men.) But this ignores not only the evidence for the dominant position of the pituitary adduced by Prof. E. C. Dodds in his Goulstonian Lectures in 1934 but the whole question of the part played by the autonomic nervous system. On that all he has to say is, "There is abundant evidence that the functional activity of some endocrine organs affects the mind and can in turn be affected by the mind." Now *a priori* one would hardly expect that, after the nervous system had succeeded in imposing increasing control over increasingly complex organisms as they evolved, it would abdicate in favour of chemotropisms. No doubt there is an autonomous ebb and flow of endocrine activity according to immediate biochemical requirements, but the blending of neural and glandular structures alike in the pituitary and adrenal in itself suggests some nervous control. The basal ganglia are the seat of emotional expression, and the pituitary-hypothalamic apparatus is now regarded as a unit where nervous mechanisms can be transformed into chemical ones. Moreover, the hypothalamus is also generally considered to be the head ganglion of the sympathetic, so that there is another route by which the emotions may influence the endocrine system, as they undoubtedly do. Now that we know, thanks to Dale and to Loewi, that this translation of nervous activity into chemical mechanisms occurs at every nerve-ending throughout the body, we may fairly

[1] *Bull. N.Y. Acad Med.*, January, 1941, p. 3

[2] *Proc. nat. Acad. Sci.*, 1939, **25**, 277.

[3] Langdon-Brown, W., *Horsley Memorial Lecture*, 1935, Camb. Univ. Press.

apply it to the endocrine system. Indeed, we may view it as integrated through the autonomic nervous system, and if the pituitary is the leader of its orchestra the hypothalamus is its conductor. This is not to deny the value and interest of Dr. Cramer's paper, which may be read in conjunction with Dr. P. E. Smith's article[4] on the relationship of the anterior pituitary to the other endocrine glands. This is an admirable review of our present knowledge which, while admitting the principle of antagonisms, does not dethrone the pituitary in favour of a matriarchal system. He also lays stress on a very important though neglected aspect—the selective capacity of the end-organ to respond to a hormone, which must play an essential part in the action and interrelations of the endocrine glands. As yet we know hardly anything of the nature of this selective capacity.

MEASURING GENIUS

More than thirty years ago Prof. Terman[5] became interested in the problem of what highly gifted persons are like during their early life. He perceived that the techniques of mental testing then being perfected offered the opportunity of attacking the question in the reverse way also. Using the new methods it became possible to select groups of children of the highest performance and then to follow their subsequent history. Preliminary observations along both lines soon convinced him that traditional beliefs on the subject were often little more than hallowed superstitions. Thorough investigation was certain to prove very expensive, but by great good fortune the genius of Prof. Terman found its complement in the generosity of the Commonwealth Fund, and twenty years ago there was initiated a scheme of research which for brilliance of conception, for thoroughness of execution, and for the fruitfulness and fascination of its results can seldom have been surpassed. It is to be hoped that many more volumes will be added to that fine series, *Genetic Studies of Genius*, in which the results are being recorded.

The first task of the Stanford workers was to select the most gifted Californian children of their time; these numbered 1,300—about 0.5% of the population. The physical and mental characteristics of the children composing the group were described in exhaustive detail in the first volume to be issued by the Stanford University Press.[6] The essential part of the plan was, of course, to re-examine these individuals at intervals and to discover what they were making of their lives. It is a fortunate circumstance that an outcry about inquisitorial and prying methods, that Press-fed menace to the betterment of human beings by research upon themselves, is likely to be least in evidence when the circumstance which has attracted the notice of the investigator is the extreme brilliance of the subject. Also, no doubt, comparative freedom from such prejudices is one of the blessings of a new country. In any event Prof. Terman, after the lapse of nearly twenty years, is still in touch with more than 95% of his group. The first re-examination took place after two years; a very comprehensive re-examination after six years filled another volume. Now we hear of a follow-up after more than fifteen years, the median age of a younger group being 27 years and of an older group 33. To the question whether the intellectual superiority of the group has been maintained, Prof. Terman says that the answer is emphatically yes. But the careers of the subjects have differed widely. At one extreme we hear of outstanding successes in various fields, and a flood of books and papers in learned journals; at the other extreme there are many who occupy humble positions.

What factors influence the translation of native intelligence into achievement and eminence? The advocates of sex equality will be sad to learn that sex is still an enormously important factor. Even if she does not marry the highly gifted girl tends to "accept whatever kind of respectable employment is at hand." So much is this so that the analyses now to be mentioned apply to the men only. Two groups were selected—A and C, the top and bottom 25%. The criterion, carefully applied, was the extent to which the individual had made use of his gifts: 90% of the A's graduated from college, only 50% of the C's; 96% of the A's were professionally or semi-professionally employed, only 28% of the C's. One important difference lay in the home background. There was a tradition of education in A homes. In line with this it was found that the heavy pressure to succeed in Jewish families ensured more accomplishment per unit of intelligence than was found in any other racial stock. Another very interesting distinction lay in the greater emotional stability of the A's; and a most important point is that it can now be seen that this difference was already detectable in the young child. No doubt as a consequence of this difference the A's marry younger, marry better, make better marital adjustments, and divorce is three times less common than among the C's. Already 300 children of these gifted persons have been tested and yield a mean intelligence quotient of 127, as compared with 150 for the group itself. It is striking that at these extreme levels the regression coefficient should still be in the neighbourhood of 0.5.

There is no space to refer to the other and fascinating aspect of these investigations—historical studies of 300 of the most eminent persons in history. But one most instructive point must not be omitted. Prof. Terman states that he was led to appreciate the importance of sound psychology in biographical studies and to apply for funds for this research by a striking piece of erroneous interpretation on the part of no less gifted and acute an observer than Karl Pearson. Pearson in his biography of Galton stated that the latter learned to read at the age of 2½ years, wrote a letter before he was 4, at 5 could read almost any English book and some French, could do any sum in addition, knew English money, and could tell the time by the clock. Pearson merely concluded: "I do not think that we can say more than that Francis Galton was a normal child with rather more than average ability." It can safely be concluded that his intelligence quotient must have been in the neighbourhood of 200, a level that not more than one person in 50,000 could attain.

In his conclusions Prof. Terman is commendably cautious; some of his more important generalizations are as follows. The typical genius is not an indomitable spirit driving on a frail body; he is healthy above the average. The typical genius is not one

4 *J. Amer. med. Ass.*, 1940, **115**, 1991.
5 *Science*, 1940, **92**, 293.
6 *Genetic Studies of Genius*, vol. 1, by L. M. Terman and others, 1925. Stanford University Press.

whose astonishing talents are confined to a single narrow interest and who is stupid at everything else ; he is highly versatile and capable of achieving success in many fields. The typical genius is not as a child the fool of the family, developing late, much to the amazement of his parents, nurses, and teachers: he displays his high gifts as soon as they can be observed and measured ; the typical genius is not a frustrated miserable being frenziedly dragging forth his gifts to mankind from the blackened recesses of a tortured soul: he is well adjusted, cheerful, happily married, and devotes himself contentedly to his work, his hobbies, and his home. Thus Prof. Terman. But there remains the difficult problem of how we should define the word "genius," a problem which of course he has not shirked. Perhaps it may yet be found that the very extremes of human achievement may not infrequently be associated with physical disability or mental unbalance—it is not hard to recall individual instances—but Prof. Terman appears to have produced very weighty evidence to the contrary when the criterion is measurable mental ability of a very high order, or when it is eminence which is extreme without perhaps being superlative.

SULPHONAMIDES FOR LUPUS ERYTHEMATOSUS

H. W. Barber, in an excellent and interesting paper,[1] shows that lupus erythematosus is often amenable to treatment with the sulphonamides. It is true that, by the employment of the heavy metals, considerable progress had been made in recent years with the therapy of lupus erythematosus. Both gold and bismuth have proved their value in dealing with it, but the results are by no means always satisfactory, and on that account alone a new line of approach to treatment is welcome. Barber has always been of opinion that lupus erythematosus must be regarded, not as a definite disease having always the same aetiology, but as a form of clinical reaction to various infective agents. He considers the streptococcus to be prominent among these, though he admits that the tubercle bacillus may in some cases be the root of the evil. He has always insisted on the importance of the removal of all obvious septic foci in streptococcal cases, and in cases of comparatively short duration the results are often very good. He admits disappointment, however, in cases of long standing. The failure, he thinks, is due at least partially to the existence of subsidiary foci not accessible to surgical removal. He believes that by the use of the sulphonamides he can attack the entrenched bacillus in situations otherwise impregnable, and the clinical cases which he quotes strongly support his contention: he has used sulphanilamide and sulphapyridine, the latter most often. A characteristic reaction appears about eight to ten days after starting treatment with these compounds, consisting of fever, focal reaction in the patches, and muscular pains. This phase is followed by lessening of the eruption. The reaction is regarded by some observers as similar to a serum reaction, but Barber thinks that it is due to the effect of the drug on the streptococci themselves, dissolving their capsules and liberating toxins the absorption of which causes the clinical symptoms mentioned. Subsequent doses of the sulphonamide usually cause progressively less severe reactions, because there are fewer organisms remaining to be destroyed. Barber brings forward evidence which tends to show that in some cases the streptococci responsible for the eruption are resident in the bowel. So many varieties of micro-organisms seem to be able to live there without causing much trouble to their host that one is inclined to doubt the pathogenicity of faecal streptococci, but Barber still thinks that in certain cases they are important. In cases where there is reason to suppose that the disease is due to a tuberculous infection these reactions do not occur, nor is the eruption improved. Barber's observations extend over some three years or more, and he states that he is now able to predict in selected cases the train of events which will follow the administration of sulphapyridine. There is no doubt that he has made a valuable contribution to the therapy of lupus erythematosus.

1 *Brit. J. Derm. Syph.*, 1941, **53**, 1, 33.

CLINICAL MEASURE OF PULMONARY ELASTICITY

To measure the elasticity of a substance two factors must be determined: (1) the force producing distortion and (2) the amount of that distortion. In the case of the lungs the first of these can be ascertained from the changes in intrapleural pressure occurring with respiration, and the second from the changes in the volume of the lungs during respiration. Both factors must, of course, be determined simultaneously. On the basis of experiments carried out in living animals by Cleotta[1] in 1913 two different methods of measuring the elasticity of the lungs in living patients have been described by v. Neergaard and Wirz[2] and by Christie and McIntosh.[3] The former determined the intrapleural pressure at those points in the respiratory cycle when the elastic forces within the lungs and thorax are in static equilibrium. By means of optical manometers on a moving photographic film the intrapleural pressure and the velocity of air flow in the trachea were measured at the same time. From the curves thus produced the authors ascertained the phase-change points on the intrapleural pressure curve, the volume of tidal air, and the "factor of elasticity." In order to take into account the variation in size of the lungs in different persons they advised that the volume of the lung in expiration should be calculated from a radiograph of the chest by the formula of Rohrer.[4] Christie and McIntosh registered simultaneously the volume of tidal air and the intrapleural pressure. They consider that the maximum change in intrapleural pressure between expiration and inspiration, as measured in centimetres of water, divided by the volume of tidal air in 100 c.cm. corresponding to that change in pressure, is a measure of elasticity, which they called the "unit of pulmonary distensibility." Whereas this value varied considerably in different individuals, it was remarkably constant in the same person and was independent of changes in the tidal air. To correct for this variation, due, among other things, to differences in the size of the lungs, and to furnish a normal standard of comparison between individuals, the "coefficient of distensibility" was adopted. This was defined as the change in the intrapleural pressure which accompanies ordinary inspiration. J. R. Paine,[5] who has recently investigated the elasticity of the lungs in twenty-three patients by both these methods, found that of Christie and McIntosh to be superior to that of v. Neergaard and Wirz, the technique being simpler and the results more consistent. In eight patients whose lungs were thought to be normal the change in intrapleural pressure accompanying an increase in the volume of the lungs of 100 c.cm. (unit of pulmonary distensibility)

1 *Arch. ges. Physiol.*, 1913, **152**, 339.
2 *Z. klin. Med.*, 1927, **106**, 35, 51.
3 *J. clin. Invest.*, 1934, **13**, 279.
4 *Arch. ges. Physiol.*, 1916, **165**, 445.
5 *J. thorac. Surg.*, 1940, **9**, 550.

varied from 0.79 to 1.56. The change accompanying an ordinary inspiration (coefficient of pulmonary distensibility) in the same patients varied from 3.4 to 7.6. The latter is considered by Paine to be the best measure of pulmonary elasticity. Out of ten patients with bronchial asthma, chronic bronchitis, or both, nine showed decreased pulmonary elasticity, the decrease being marked in seven of them. Slight pulmonary emphysema cannot be diagnosed with certainty by *x*-ray examination, but it was found that where the emphysema was extensive the radiological interpretation of chest films correlated well with the measurement of pulmonary elasticity. In eight patients with moderate to severe emphysema as determined by *x*-ray examination, the unit of pulmonary distensibility was found to vary from 2.19 to 8.73 and the coefficient of pulmonary distensibility from 11.20 to 21.83.

ACACIA FOR THE NEPHROTIC SYNDROME

It is well known that in oedema of nephrotic type the serum proteins are diminished. This finding is common both in cases diagnosed as lipoid nephrosis and in cases of glomerulonephritis in the subacute stage, with persistent oedema. It is unnecessary to repeat here the reasons for believing that this reduction in serum protein (and therefore in colloid osmotic pressure) is an important cause of the oedema. This is the rationale of the high protein diet of intravenous acacia, and, more recently, of injections of concentrated human serum.

Hartmann[1] was the first to use acacia systematically, and reported good results in children. Later reports, however, varied considerably. Some workers have observed ill effects, including enlargement of the liver, so that with many physicians acacia treatment has fallen into disfavour. Goudsmit and Binger[2] at the Mayo Clinic have therefore made a careful study of the results of acacia treatment in forty adult patients. The preparation used was a 6% solution of gum acacia in 0.06% sodium chloride. Particulars are given of the method by which it is prepared; this is of great importance in the avoidance of unpleasant reactions. The solution is administered intravenously, in doses of about 500 c.cm., forty-five to seventy-five minutes being taken for the injection. This is repeated every day or every other day until a total dosage of 60 to 100 grammes of acacia (1½ to 2 grammes per kg. body weight) is reached. Other methods of treatment are combined with this, especially a high-protein salt-free diet, restriction of fluid intake to one litre or less, and the administration of diuretic salts, the one generally used being potassium nitrate in doses of 6 to 12 grammes daily. This salt is given by mouth in 1/2-gramme capsules, and should be begun three or four days before the injection of acacia. The importance of these accessory measures is stressed by the authors, but it is obvious from the case histories that the results could not have been achieved without the acacia. For instance, the first patient, after all other treatment had proved useless, lost 23½ lb. in weight after the first injection of 350 c.cm. of acacia solution. In forty cases there were only four which failed to respond by loss of all, or of practically all, the oedema. Some of the cases showed some degree of renal insufficiency, and no attempt was made to restrict the treatment to cases of pure nephrosis. The only undesirable effects were urticaria, thoracic discomfort, and fever; but they were never serious. The ill effects noted by other authors, including liver enlargement, were not observed. It is probable that when these occur they are due to the administration of too much acacia or to lack of care in its preparation. Failures were usually the result of the administration of insufficient diuretic salts or insufficient acacia, and of failure to control the anorexia and vomiting that sometimes occur in these patients. In the successful cases an average of from 1 to 3 lb. in weight was lost per day. A second course of treatment, if necessary, can be given after an interval. Reports so far published on the use of concentrated serum in renal oedema do not show consistently successful results, and in most laboratories the concentration presents technical difficulties. The use of acacia as a routine in the treatment of these obstinate cases therefore seems to be justified.

1 *J. Amer. med. Ass.*, 1933, **100**, 251.
2 *Arch. intern. Med.*, 1940, **66**, 1252.

BUERGER'S DISEASE AND TYPHUS

Thrombo-angiitis obliterans, or Buerger's disease, is an unfamiliar though not altogether unknown condition in this country. It produces severe pain and ultimately gangrene of the lower extremities at an earlier stage in life than that of most degenerative arterial lesions, and is said to occur almost exclusively among Jews. It is not a degenerative but an inflammatory lesion, an arteritis leading to thrombosis with subsequent canalization. This fact alone strongly suggests an infective origin, and the suppositions that excessive use of tobacco or alcohol, changes in the viscosity, coagulability, or volume of the blood, or excessive consumption of salt are responsible in any way for the disease have little to support them. Both accidental and deliberate transmission of the disease by material from the lesion have also been known, a fact pointing strongly to the presence of a microbic cause. It was first suggested many years ago by C. Goodman that the disease may be a late manifestation of typhus, and he now[1] restates the evidence in favour of this hypothesis and adds to it Some of this evidence is only suggestive; the lesion of typhus is, of course, vascular—although smaller vessels are attacked in the acute stage—and peripheral gangrene is recognized as a complication both of typhus and of other rickettsial infections. The belief that the disease is restricted to the Jewish race, which would of course introduce an aetiological factor hardly compatible with so positive a primary cause as typhus infection, is mistaken; in America it chiefly attacks recent immigrants from Eastern Europe, who often happen to be Jews, but who include Estonians and Russians; in Russia, Gentiles as well as Jews are attacked, and the Chinese and Japanese also suffer from it. More direct evidence is the alleged demonstration of rickettsial bodies in the vascular lesions, and the demonstration of cutaneous sensitivity to a rickettsia suspension in almost all of a large number of cases of thrombo-angiitis obliterans tested for this, with almost consistently negative results in control patients; the suspensions used gave similar results in patients known to have had typhus. Although our opportunities of studying this problem are fewer, the possibility of past typhus is perhaps worth while bearing in mind in cases of unexplained peripheral gangrene.

The next session of the General Medical Council will open on Tuesday, May 27, at 2 p.m., when the President, Mr. H. L. Eason, will take the chair and deliver an address.

1 *J. Mt. Sinai Hosp.*, N.Y., 1941, **7**, 391.

The Governors of the Society of the New York Hospital, created by Royal Charter in 1771 in the reign of King George III, announce the recent completion at the New York Hospital, Westchester Division, White Plains, of the Nichols Memorial Cottage, in memory of Dr. Charles H. Nichols, attending physician 1849 to 1852, medical superintendent 1877 to 1889.

MEDICAL PLANNING COMMISSION

FIRST MEETING

SCOPE AND PROCEDURE DISCUSSED

The first meeting of the Medical Planning Commission, which has been set up by the British Medical Association, with the co-operation of the English Royal Colleges and the Scottish Corporations, to study wartime developments and their effects on the country's medical services both present and future, was held at the B.M.A. House, London, on May 7. More than sixty of the sixty-seven members of the Commission were present.

Welcome by Chairman of Council

Mr. H. S. SOUTTAR, in welcoming the members, said that he believed no body had ever met which had so fully represented the medical practice of the country in all its varied aspects. The problems of medical service after the war would be complex and difficult enough, but upon their solution would largely depend the health of the nation. It was the profession's desire that every individual should have at his service, whatever his economic status, all necessary medical resources. This country had gone a long way towards achieving that aim, for the whole population in industrial employment was included under national health insurance. There was a strong feeling that the service enjoyed by the worker should be extended to his dependants, which would mean that nearly 80% of the population would be included, and if, as had also been suggested, the insurance income limit were raised, possibly 95%—or some forty million individuals—would be cared for by this service. Moreover, there was a strong demand that a consultant and specialist service with full hospital facilities should be added. The provision of a complete medical service for 95% of the population constituted a problem of the first magnitude. It might be met by establishing a whole-time State Medical Service; this would be a complete break with the traditions of medical practice in this country, but it must be carefully examined. On the other hand, the present service might be developed, but here again the great changes which its extension would bring about had to be considered. On one point they would all agree, that everything within their power must be done to maintain the close personal relation between doctor and patient which had been characteristic of British medical practice.

Mr. Souttar concluded by saying that although the Commission had been initiated by the British Medical Association it was an entirely free body, not bound by the Association's policy. It would carry on its business as it determined, but the whole resources of the Association were at its disposal, including secretarial and clerical assistance. To assist discussion the secretariat had drawn up a memorandum, purely for information, embodying the views on practice accepted by the Association, as well as by other societies and individuals, also a bibliography of the more important literature on the subject.

Election of Chairman

On the motion of LORD DAWSON OF PENN, seconded by Sir ALFRED WEBB-JOHNSON, Mr. Souttar was unanimously elected to the chair of the Commission.

Additions to Membership

Suggestions from several bodies for special representation on the Commission were on the agenda.

In reply to Dr. G. F. BUCHAN, who asked what was the position of members in relation to the bodies by which some of them had been appointed, the CHAIRMAN said that none of the bodies represented was bound in any way by any report which the Commission might issue, unless, of course, it chose to adopt it. The speech or action of its representative did not bind any body. One request for representation which he thought should be acceded to was from the Medical Advisory Committee of the Nuffield Trust, which asked that its chairman, Sir Farquhar Buzzard, be appointed. He proposed that this suggestion be adopted. This was agreed to.

The CHAIRMAN said that the Ministry of Pensions desired to send an observer. The Ministry of Health and the Department of Health for Scotland had observers on the Commission. Dr. BUCHAN mentioned a number of other Government Departments and quasi-Government Departments with medical interests which might make a similar request, and said that he was not quite sure how far it was necessary or desirable to carry this principle. After a short debate it was agreed to postpone the consideration of this request until it was known whether and what other claims were made on behalf of official bodies.

Dr. E. A. GREGG said that the Insurance Acts Committee, of which he was chairman, had had before it many serious criticisms of the composition of the Commission, and was satisfied that there was considerable feeling throughout the country that general practitioners were not sufficiently represented. If additional general practitioners were appointed by a representative body it would go far to create a favourable atmosphere in the profession generally for the consideration of the reports which would eventually issue from the Commission. Dr. D. G. GREENFIELD spoke to the same effect, while admitting that there were a number of general practitioners on the Commission already.

The CHAIRMAN said that twenty-four members of the Commission might fairly be described as general practitioners; nevertheless, he had sympathy with the request of the Insurance Acts Committee. Dr. J. B. MILLER said that there was no criticism of the general practitioners already appointed, except on the ground of their age, and even in that respect the experienced practitioner was perhaps more valuable on a commission of that kind than the young. But the feeling on the subject was due to the fact that practitioners as a body had had no opportunity to nominate representatives. Prof. R. M. F. PICKEN supported the proposal. Mr. BISHOP HARMAN said that while he sympathized with the view of the Insurance Acts Committee, he felt that the addition of a few members would make no difference to the influence which general practitioners would exercise on the findings of the Commission. Sir JAMES WALTON agreed that the real power would lie in the sectional committees, but what was now proposed would help to allay the criticism that the general practitioner, especially the rural practitioner, was not adequately represented. The great difficulty that the Commission might have to encounter was lack of unanimity in the profession, and so long as there was a feeling that general practitioner interests were not fully represented such unanimity would be all the more difficult to secure.

After some further discussion it was agreed that the Insurance Acts Committee be asked to nominate four general practitioners (three urban and one rural). On the suggestion of Dr. J. W. BONE, Dr. GREGG undertook to ask his committee to ensure that one of the nominees was from a colliery area.

Mr. SOMERVILLE HASTINGS said that it was important to represent ideas, not interests only, and therefore he asked for direct representation of the Socialist Medical Association. Dr. PETER MACDONALD, while having no special sympathy with the aims of that body so far as he knew them, thought it would be wise to accede to this request. Dr. J. M. MACKINTOSH thought the meeting was in danger of getting hopelessly entangled between representation and delegation. Mr. ZACHARY COPE suggested that the Commission had at least one very experienced and well-informed member of the Socialist Medical Association—Mr. Hastings himself. The Commission decided not to give special representation in this instance. Mr. G. F. GIBBERD pointed out that there were only three obstetricians and gynaecologists on the Commission, and urged an increased representation. The CHAIRMAN suggested that the proper course here was co-option on to the appropriate committees. Dr. DAVID WILSON urged the claims of the Association of British Ophthalmologists.

Dr. G. C. ANDERSON (Secretary) said that some members were looking at this matter from the wrong angle. The idea in appointing members to the Commission was to obtain a number of people who had some contributions to make to the problems in hand. With few exceptions they were chosen not because they happened to be representatives of a particular organization but because they were known by their writings or work to have something useful to offer. If now they started to form a commission composed of people who were there because they represented this or that organization they would get a body which in the end would not produce any report at all.

Dr. INGLIS CAMERON said that it was now clear that there were no delegates on the Commission, only a certain number of representatives, and others who were present in an individual capacity. He felt that the able letter by

Mr. Souttar in a recent issue of the *Journal* went far to satisfy the critics, and if now a short statement could be published explaining a little more clearly—though not too precisely—the purpose of the Commission, the interpretation of its reference, and the status of its members in relation to the bodies appointing them it would complete the process of "disarmament."

Dr. S. WAND suggested that the question of representation of medical students and of members of the profession serving in the Forces might be considered. The CHAIRMAN thought that the views of these groups again might be most usefully elicited in the committees. The National Union of Students (British Medical Student Association) had already been asked by himself to submit a memorandum for the Commission at a later stage.

The Commission then agreed to the membership as originally set out[1], subject to the additions made—namely, a representative of the Medical Advisory Committee of the Nuffield Trust and four general practitioners to be nominated by the Insurance Acts Committee.

Scope of the Commission

Lord DAWSON OF PENN said that members of the Commission might be assisted if they perused again the report of the Consultative Committee on Medical and Allied Services, which was appointed by the Government after the last war to go into a good many of the questions which the new Commission would have to face. It was always a matter of pride to him as chairman that that committee reported unanimously. He thought the Commission should avoid trying to put up something brand-new or something which aimed at too great completeness. The practice of medicine had been built up generation by generation, and it was only because medical knowledge had so far outstripped the organization of the practice of medicine that it was necessary for a body like this to pass the practice in review. In trying to plan so as to meet the needs of modern society with all its economic difficulties and at the same time to recognize the great growth of knowledge that had taken place, he thought they should bear in mind the "inevitability of gradualness." The most important question to settle was the regionalization of hospitals and health services. The practice of medicine in all its branches must become increasingly institutional, partly because of the growth of knowledge and the need for team work, also because the best that medicine could provide should be made available to every citizen. Some professions would be quite easy to plan for, but in medicine it was difficult because while planning the fabric they must preserve freedom of thought and initiative. It was not easy to apply collectivism to the fabric and yet maintain individualism in the human relationships. Another big question was the bridging of the gap between preventive and curative medicine. If these basic principles were settled first, all other things would be added unto them. He hoped the Commission would not attempt to issue a single report at a particular time, but rather to publish interim reports—no matter how many so long as they preserved a certain sequence. With regard to regionalization, which seemed to him the first problem to be tackled, it was well to remember that this was not new, it was dealt with by the Consultative Committee to which he had referred, but now it came forward with a certain urgency owing to the war. War did not so much create new problems as bring to the forefront problems which had been for long in the stage of incubation. Some most excellent work on this subject had already been done in Oxford under the auspices of the Nuffield Trust, and of this the Commission would take cognizance. The Commission must also address itself to the bridging of the gap between preventive and curative medicine so as to endeavour to present a united medicine to the student of the future. This fitted in with regionalization; and, this achieved, more than half the work of the Commission would be done. The work of the Commission would be carried out mainly in committees, which would have considerable freedom of action and would co-opt representatives, not of interests, but of different aspects of knowledge and experience. He suggested that to get a team in each committee it would be well to appoint nomination committees in the first instance. In conclusion Lord Dawson said that he liked to think of the medical profession filling its great place in the body politic. There was no profession which had widened in their generation to anything like the extent that medicine had done. The whole of the problems concerned with constructive health had really become part of medical thought in relatively recent years. They were not yet fully accepted, but it was largely because of their gradual acceptance that the Commission had been assembled to undertake a task of integration which he hoped would result in an even greater profession than the one they had had the honour of serving.

Sir FRANCIS FREMANTLE, M.P., said that there was much talk about revolution in the whole procedure of medicine, but he hoped the Commission in its public pronouncements would be on guard against revolutionary suggestions which would antagonize opinion in Parliament and in the country. The proposals they put forward should be based on the natural processes of growth. The question of medical auxiliaries, in particular the extension of the work of the district nurse, would he hoped be borne in mind.

Mr. SOMERVILLE HASTINGS felt that the Commission would want to know a great deal more about the conditions of general practice, hospital practice, and so on. The first thing to do was to bring their knowledge of conditions as they were right up to date. He appealed to members of the Commission to put away all preconceived ideas and to think only of the future of medicine and of the people of this country, without thought of sectional interests or individual interests or even of the interests of the profession as a whole.

Dr. G. F. BUCHAN thought that the first business of the Commission should be consolidation. It seemed to him that the two main subjects for consideration were general practice and hospital practice. General practitioners and public health practitioners had been unfortunately to some extent in conflict. The thing for the Commission to do in the first instance was to ascertain what common measure of agreement there might be, not to publish separate reports putting forward sectional points of view.

Procedure

On reassembling in the afternoon the Commission had before it certain suggestions for procedure. These were that there should be established five committees, dealing respectively with general practice, special practice, public health, hospitals, and the teaching hospitals, and a sixth, a Co-ordination Committee, which would integrate the reports of the others into one draft report. The five subject committees would meet separately (or jointly, when thought desirable) and consider the principles of medical organization or reorganization within their spheres, endeavouring to report progress to the Co-ordination Committee by the end of the year or as soon as possible thereafter. The draft reports of the Co-ordination Committee, before being approved by the Commission, would be submitted to the bodies represented thereon and to the profession generally and the comments and criticisms received would be considered by the Co-ordination Committee, which would then submit a draft report or reports to the Commission, with such criticisms and recommendations received as had not been included in the reports. Following this, the general principles having been laid down by the Commission, fresh committees would be set up to elaborate details of its policy.

Mr. BISHOP HARMAN urged that the sectional committees should be recommended to ask any representative medical organization concerned in that sphere of practice for the opinion of its members on general policy within that sphere and on such details as might arise. Many of the criticisms which had appeared in the *Journal* would be withdrawn if it were known that all groups of practitioners would be consulted on the particular matters with which they were concerned.

Dr. D. STARK MURRAY criticized the terms of reference for the proposed committees. Instead of considering the principles of organization and development in the five fields named, they might well concentrate on the discussion of domiciliary medical service, the prevention of disease, preservation of health, and treatment of the sick, allowing the consideration of special work to wait for the present.

Colonel R. G. GORDON thought that the work of the Commission might very well be done through a different set of committees from the ones proposed. Thus there might be committees concerned with domiciliary service, with hospital service, with out-patient clinics, with preventive medicine, with rehabilitation, with ancillary services, and with medical education.

[1] See *Supplement*, Jan. 4, 1941.

Dr. H. G DAIN said that there was some danger that the committees might start with different outlooks and bring to the Co-ordinating Committee work badly arranged from the point of view of the Commission as a whole. The better thing would be to establish the basic principles and ask the committees for their criticisms on these before they considered their own specific departments. Mr. WILFRID ADAMS suggested that some committee should consider not only the education of the profession but the education of the public in hygiene and an elementary knowledge of disease. Dr. H. H. MACWILLIAM said that from the Chairman's opening remarks it appeared that a future must be visualized in which 5% of the population would provide all the funds for private practice, and even this proportion might be still further diminished if the war went on for a very long time. The economics of the profession seemed to be a subject worthy of consideration by a committee. With regard to regionalization, a point that troubled him in the Nuffield Trust arrangements was that apparently they visualized an area from Anglesey to Carlisle with one key hospital in the centre. On these questions it seemed to him that the suggested procedure of the Commission was well adapted to get useful answers.

Mr. JOHN HUNTER, Dr. FRANK GAY, and Dr. O. C. CARTER supported the arrangement for committees as laid down in the original suggestions. Mr. SOMERVILLE HASTINGS said that the first thing to do was to make a survey, either as a Commission or through the committees, of the various fields. Medicine was not a science: its present position had been reached largely by a series of happy accidents. He did not think that basic principles could be immediately determined. They must be influenced in their deliberations by expediency, and the basic principles of organization had to come last of all. Their task was to arrange for an efficient service for the public, and it would be a mistake to try to pin that down to basic principles, as to which most of them had already preconceived ideas.

Dr. ANDERSON (Secretary) explained the idea behind the planning of the committees. The General Practice Committee, for example, would want to find out what was the state of general practice at the present moment, whether it should be linked up with some other agencies at work in isolation, and how to reconcile collective responsibility with individual freedom. Then the Co-ordinating Committee would come into being and would be able through the representations it received from these committees to lay down the basic principles to guide all concerned in the future consideration of the problems.

Dr. J. A. BROWN pointed out that certain basic principles had already been put forward in the Association's grey book, "A General Medical Service for the Nation."

The proposal to set up the five committees, together with a co-ordinating committee, was generally approved.

The Teaching Hospitals

Some discussion centred round the appointment of a Teaching Hospitals Committee.

Dr. S. WAND objected to the term "teaching hospitals," and wanted the committee to have as its reference "medical education, including postgraduate education and research." Dr. DAIN questioned whether it was right to exclude the teaching hospitals from the terms of reference of the Hospitals Committee. Apart from teaching, the work of those hospitals was the same as that of hospitals generally. Mr. SOMERVILLE HASTINGS hoped that at some time in the future all hospitals might be used for teaching, and that the Teaching Hospitals Committee, even if it retained its name, would in effect be a medical education committee. Prof. PICKEN said that this division of hospitals was quite irrational. Those who had been associated with the development of the municipal hospital knew that to an increasing extent it took part in teaching.

Sir ALFRED WEBB-JOHNSON thought that most of the objections to the separation of these two committees would be overcome if the Commission decided that the Hospitals Committee should consider all hospitals as within its province, including teaching hospitals. Nevertheless there were problems peculiar to the teaching hospitals.

Sir GIRLING BALL spoke to the same effect. The teaching hospitals were themselves very anxious to come into contact with other hospitals, especially municipal hospitals. Therefore he thought one committee could do the whole of the work as regards hospitals, except for the special problems relating to medical education.

It was then agreed that the words "excluding teaching hospitals" should be deleted from the terms of reference of the Hospitals Committee, which were to consider and report "on the principles of organization and development of hospitals, voluntary and council."

The terms of reference of the Teaching Hospitals Committee read: ". . . the principles of organization and development of teaching hospitals," and Mr. HASTINGS moved to substitute the words "the teaching of medicine." Mr. HUNTER thought that this would open up a wide issue, nothing less than the whole of the medical curriculum. Sir A. WEBB-JOHNSON pointed out that the original terms of reference did not exclude clinical teaching, whereas the terms which Mr. Hastings proposed excluded the teaching hospitals. The CHAIRMAN suggested the words "hospitals engaged in undergraduate and postgraduate education," but Mr. HASTINGS was still not satisfied, saying that he was not convinced that teaching must always be within the walls of a hospital. He would not rule out the possibility of some medical education being undertaken by general practitioners.

Eventually Sir ALFRED WEBB-JOHNSON moved, and Sir GIRLING BALL seconded, that the reference should be: ". . . on the principles of organization and development of the teaching hospitals and clinical education." Mr. HASTINGS said that this satisfied him, and the amendment was approved by the Commission.

Appointment of Committees

Certain nominations for each of the committees were then agreed to. The nominations were so arranged that each committee contained a majority of those with a direct interest in the subject of the reference and a minority of practitioners not so directly interested. The Co-ordination Committee was created to consist of the Chairman of the Commission, the Chairmen of the five subject committees, and three members appointed by each of those committees.

A brief discussion took place on the powers of the committees to co-opt additional members from outside, and it was agreed that each committee should have the power to co-opt two members, but that the Chairman of the Commission should have power to authorize the co-option of four members in all if he regarded it as necessary.

Colonel GORDON mentioned the desirability of eliciting the views of members in the Services. He suggested that when draft reports from the Co-ordinating Committee were about to be presented some member should go preferably to each Home Command, and there, at the central hospital, it would not be difficult to get a large number of medical officers from surrounding hospitals to attend, and they would be able to express their opinions and air any grievances.

The CHAIRMAN said that this valuable suggestion would be noted. He thought the proposal made earlier by Mr. Bishop Harman concerning the eliciting of opinions from representative medical organizations had been met by the proposal to issue draft interim reports and by the arrangements for securing adequate representation by co-option and otherwise of the views of groups and bodies not represented on the committees, and in particular practitioners on service. The question of increased representation of obstetricians and gynaecologists to which Mr. Gibberd had referred had better be left to the committees themselves.

This concluded the business of the first meeting.

Speaking at the annual meeting of the Cremation Society, Lord Horder (the new president) said that the first great war created an increased interest in cremation, and it was safe to prophesy that the second great war will take this increased interest still further. For the first time in its history cremation was being placed on an equal footing with earth burial. Many local authorities were reducing their fees in cases of air-raid victims. The society's annual report showed a record increase of 27% in the number of cremations carried out in Great Britain during 1940—25,175, compared with 19,813 in 1939 and 11,289 in 1936. The number of crematoria had increased from thirty-three in 1936 to fifty-six in 1940.

BLAST PROTECTION FOR HOSPITAL WINDOWS

Air raids are increasing in their intensity; the weight and destructive capacity of bombs are greater, and hospitals are more likely to be put out of action even from a "near-miss." Experience has shown the need for bricking up the windows of resuscitation wards. It is not only that destruction of windows and black-out material raises difficult problems of lighting, but the temperature of the ward may fall so seriously as to endanger the patients from that cause alone. Arguments for occluding the window-openings apply to theatres too; and, with somewhat less force, to general wards, where bricked-up windows mean difficulties of ventilation and serious interference with the patients' comfort.

If the principles of "switching," to which reference has recently been made, are understood and acted upon, the number of casualties admitted to any one hospital during a heavy raid will not usually be great, and possibly a good plan would be to have "safe" accommodation in the larger central hospitals for, say, 100 patients. When not required for casualties, wards are frequently used for general hospital purposes, and it might be well to brick up two windows out of three in such wards, the third window having bricks only to a height of, say, 6 ft. or 6 ft. 6 in. from the sill-level. If the top part of these windows should go it will be necessary, to make the black-out effective, to have portable screens ready to put quickly in place. Unless something of this sort is done, the wards will really not be habitable or usable for dual purposes. There will still be danger from flying glass, but there do not appear to have been many injuries from this source in wards with unprotected windows. In wards where patients stay for two or three weeks loss of sunlight is a serious deterrent to recovery, but in a resuscitation ward, where the usual stay is a matter of hours, it is not so important.

Every hospital should have one theatre with blocked-up windows unless there is an underground theatre or one so situated inside the building that it is not subject to blast. In the present state of the labour market it would be idle to ask for the bricking-up of all windows in hospitals in vulnerable or specified areas, but there is a recognized machinery for obtaining help in matters of both labour and supply of materials. It is unfortunate that comparatively few members of the profession fully understand the Regional organization of the Ministry of Health, which provides that machinery. It is based upon the Civil Defence Regions, in each of which there is a Commissioner, who, in the event of the isolation of his region, becomes what might be called "viceroy." At his headquarters he has a staff of officers of the Ministry of Home Security, with a Senior Regional Officer (S.R.O.) in charge. The Ministry of Health has a regional headquarters staff in a near-by building in the charge of its own S.R.O. Between the two Ministerial headquarters there is a liaison which is closer in some Regions than in others. Approach to the S.R.O. of the Ministry of Health for E.M.S. purposes by all medical officers of health or superintendents of hospitals is through the Hospital Officer of the Region, who may be reached directly or through the Group Officer. In Region V (London) the Sector Group Officers have the status of Hospital Officers and have, like Hospital Officers, direct access to the Director-General.

A great deal of authority has been delegated by the Ministry of Health to its Senior Regional Officers so that there may be no delay in putting in hand urgent work which complies with the requirements of settled policy. Moreover, representations made to Regional Officers are transmitted to the Ministry and receive consideration in modifications of policy which changing conditions may dictate.

A proposal, such as that to brick up windows, should be put through the Hospital Officer to the S.R.O., who, if he approves, will authorize expenditure (ranking for grant) and do his best to facilitate and expedite "supply" of both material and labour. All work entailing expenditure of money, labour, or materials should be put forward with a reasoned statement of its necessity and urgency to the S.R.O. He, within limits, has power to put matters in hand at once, and in very many cases can do so without reference to Whitehall.

Local News

ENGLAND AND WALES

The Westminster Hospital Carries On

A heroic story can now be told of the new Westminster Hospital at Millbank. This hospital received direct hits; the most serious blew out all the windows and cracked or broke down many walls and partitions. But the hospital never ceased to function. The out-patient departments reopened within a week, and within three weeks had a daily attendance of 400 patients. Within a week also 50 beds were again available in the wards, within a fortnight 169 beds, and within three weeks 292, which is to be the maximum for the next three months at least, as compared with 250 before the raid. One side of the hospital was put out of action and has been sealed off; a single wall now divides the normal hospital activities from a ruined building. When the bomb struck Westminster Hospital an operation had just been completed, but in spite of the fact that the four occupants of the theatre were buried knee-deep in debris only a slight scratch was received by one of them. On the night of the occurrence bad casualties had to be admitted to the wards, and some were treated at the first-aid post attached to the hospital. During the raid all the patients in the wards were evacuated to the basement by the staff; this took place while fires were raging around the hospital and one on the fourth floor of the hospital itself. A basement room was quickly fitted up as a theatre, and casualties were attended during the whole of the time. Dr. O'Brien, representative of the Rockefeller Trust, was present and afterwards sent a letter to the Minister of Health praising in the highest terms the courage and skill shown by all concerned in dealing with a frightful situation, also mentioning the complete lack of panic or hysteria among the patients themselves, thanks to the matter-of-fact behaviour of the staff. Westminster Hospital has an arrangement with the Surrey County Council whereby 25 beds have been opened in Surrey, the hospital providing complete equipment and staff. Six medical students are in residence there; others are obtaining clinical instruction at hospitals elsewhere in the sector.

St. Bartholomew's Under Fire

Of the eight hundred years which St. Bartholomew's has seen, 1940 was surely the most exciting. The treasurer's report, usually a pedestrian document, tells a heroic story. The hospital has been hit several times during aerial bombardments, but without very serious damage. In September a high-explosive bomb fell immediately outside the nurses' home without causing casualties, and later in the same month a bomb fell on the anatomical lecture theatre and its annexes, which were completely demolished, but the buildings were unoccupied. More recently a bomb fell through the roof and floor of the operating theatre in the casualty block, but did not explode, and the damage, though substantial, was only a fraction of what would have been caused had it done so. On the night of December 29, when thousands of incendiary bombs were dropped on the City of London and very large fires were started, the hospital was for a time deprived of its supply of water, gas, and one circuit of electricity, and it was receiving air-raid casualties, of which nearly one-half had to be kept in the wards. At about ten o'clock that night the police warned the hospital that the fire brigade was finding difficulty in checking the flames, and that it might be necessary to order complete evacuation at very short notice. As the lifts were out of action it was decided to begin immediately to evacuate 102 of the 223 patients in hospital. These patients were carried on stretchers down the stairs, loaded in motor coaches, and taken without mishap to a sector hospital, all within two hours. On numerous other occasions the hospital has found itself the centre of an area which appeared to be the enemy's main objective, and the treasurer, on behalf of the governors, expresses his profound admiration "of the loyal, devoted, and courageous manner in which they conducted themselves on all occasions. . . . The medical staff, aided nobly by the students and members of the lay staff, have given of their best, and all I need say is that Bart's expected of them no less." Every roof of the hospital has been fitted with fire-

fighting appliances, and six regular fire squads are on duty every night.

The income of Bart's in 1940 (£203,000) is down by £12,000 on the year. There has been a large diminution of income through loss of rentals of hospital property owing to enemy bombing. The daily average number of patients in hospital was 137, and the average duration of stay just under ten days. The first attendances of out-patients numbered 12,680, as compared with 21,790 in 1939, and the first attendances of casualty patients just upon 42,000.

Correspondence

Treatment of Burns

SIR,—Mr. Rainsford Mowlem (May 3, p. 686) raises a most interesting point in the last sentence of his letter on the treatment of burns. He says that he hopes that in the near future only innocuous substances will be issued to first-aid posts, etc. I heartily agree. So often one finds that a burn has been sent up to hospital covered with one of the excellent coagulant jellies applied by someone who is not qualified to use them. When such a case arrives, it is very hard to see the extent of the burn, and often it is not until the patient is in the theatre that one finds out just how bad the burn is.

Surely the most important thing in dealing with burns is the cleansing of the burn under an anaesthetic in the operating theatre, and for first-aid work a compress of sodii bicarb. is all that is required to allay the pain of the burn. When the patient arrives in the hospital this can easily be removed without sticking, and the burn can then be correctly examined. Would that the first-aid workers will remember this.—I am, etc.,

Royal West Sussex Hospital, May 5. JOHN GORDON.

Subcutaneous Ligature of Varicose Veins

SIR,—I was interested in Dr. H. S. Russell's article (April 26, p. 626). He realizes that something more than mere injection of large internal saphenous veins is necessary if occlusion and permanent or semi-permanent results are to be obtained. I quite agree that the trend of the most modern treatment of varicose veins has swung back from pure injection to a combination of ligature-injection—even better, to excision of a portion of the internal saphenous vein. The last-mentioned is really the only guarantee against recanalization. But I also agree that his excision lifts the treatment out of the hands of capable general practitioners merely for want of an operating theatre and an assistant.

Now Dr. Russell's method of the insertion of a perineum needle right through skin, subcutaneous tissue, and varicose vein seems to me to be rather a crude procedure which is adopted merely because the refinements of an operating theatre are denied to the average G.P. and to the vast majority of his patients; he could secure the theatre in a nursing home for his richer patients. I have always maintained (and been able to substantiate it in my large varicose vein clinic) that even the largest "drain pipes" can be occluded provided that: (1) An empty vein technique is employed—pneumatic tourniquet. (2) A sufficiently strong sclerosing solution is used—e.g., lithium salicylate 35% with 1% ethocaine, and quinine with urethane injected from separate syringes, preferably quickly through the same large-bored needle. (3) And, above all, that the vein is subsequently tightly compressed, so that the sides of its walls are kept in apposition for two to three days after the injection by firm compression with elastoplast. This is done by covering the injection site with collodion and either a firm wad of wool or about two inches of elastoplast rolled up into the form of a "cigarette," which is laid over the course of the vein; then elastoplast is applied, and the side flesh is drawn towards and over the "cigarette," and flesh from the other side is approximated so that not only the rolled elastoplast ("cigarette") but the flesh from the sides itself compresses the vein. This strapping is left on for three days.

With this procedure recanalization is rare. I am sure that with this procedure recanalization is not more likely than after the method described by Dr. Russell. Moreover, the injection method, followed by tight compression, is far less painful for the patient than Dr. Russell's method.

Another criticism of his method is that it opens the way to sepsis. In the treatment of 10,000 patients I have not yet had any case of sepsis following an injection.—I am, etc.,

Liverpool, May 2. STUART MCAUSLAND.

Abdominal Symptoms after taking Opium

SIR,—The correspondence in the *Journals* of February 8 (p. 215), March 22 (p. 461), and May 3 (p. 688) on abdominal pain after opium administration prompts me to write, but I have selected the title "abdominal symptoms" rather than "abdominal pain" to stress the possibility of severe vomiting where opium has been prescribed.

Mr. H. P. Winsbury-White (p. 461) quotes Sir Lauder Brunton's book as saying that opium stimulates intestinal peristalsis in some cases. I believe that the account of the action of opium in Hale White's *Materia Medica* (1935, p. 297) best explains the abdominal complications met with in practice. "Opium produces great loss of gastric tone, often spastic contraction of the pylorus, and inhibition of normal peristalsis in the stomach. Its emptying is delayed. In the small gut peristalsis and tone are increased. In the colon tone is often so great as to produce spasticity, and therefore further delay in the passage of food." A consideration of this description explains the sickness which may occasionally be so prolonged as to cause anxiety in seriously ill patients.

Personal experience leads me to believe that pain when it occurs is due to spasm of the pylorus. I have taken omnopon in a moderate dose, by mouth, twice in my life, and have only suffered from really severe epigastric pain twice in my life. (Only because a double experience rules out the possibility of the pain having been coincidental do I admit publicly to having been so inept as to take part in the second experiment. The truth of the matter is that I had forgotten all about the first experience.)

On each occasion I was awakened after about one and a half hours by very severe epigastric pain, without pain in the hypochondrium. On the first occasion the pain was accompanied by sickness, but vomiting relieved it quite quickly. On the second occasion the pain was much more severe, and felt as if it might have been due to perforation of an ulcer. There was no sickness, but profuse sweating and a feeling of cold. After the pain had lasted perhaps ten to fifteen minutes without abating, several tablets of traesentin (an intestinal antispasmodic of complex formula) were tried. The pain was quickly and completely relieved, and sleep followed in a few minutes, but was disturbed again an hour later by another slighter attack of epigastric pain, which went very quickly after more traesentin. This drug was used because it was to hand, but atropine would appear to be a reasonable drug to use, as Mr. Winsbury-White suggests.—I am, etc.,

Norwich, May 5. STEPHEN FALLA.

Frostbite

SIR,—In a letter by Dr. Raymond Greene (October 5, 1940, p. 469) it was pointed out that in the treatment of frostbite friction of any kind is dangerous. My experience treating a number of minor cases—ears and hands—confirms this; and I found the simplest methods satisfactory.

To avoid infection blisters were left intact and painted with a 1 in 1,000 solution of acriflavine. They were then dusted with antiseptic powder and covered with cotton-wool. Over the wool the men wore woollen gloves and Balaclava helmets. Every case responded rapidly, without sepsis. The fluid in the blisters was absorbed within two or three days, leaving dry scales which peeled off, exposing healthy skin. No friction was used, and the only thermal treatment was the prevention of heat loss described.

I had the interest of watching my own recovery under this simple treatment. One finger was swollen, cherry-red, and painful, but numbed to pinprick, cotton-wool touch, and light pressure. The skin was not blistered, although tense and devitalized. After a few days the skin on the tip cracked and began to peel. Immediately I had removed a small piece of dead skin sensitiveness returned, not only in the area thus uncovered, but throughout the whole finger. I could then detect cotton-wool touch and pinpricks in the areas still covered by devitalized skin. This immediate recovery was nearly but not quite complete. Full recovery occurred gradually in the proximal segment first, and reached the tip about a fortnight from the time of injury.

I deduce that increased tension in the finger, and not any histological damage to the nerve endings, is the main cause of loss of sensation. As I have no book with me at sea which discusses this point I can—until I am contradicted—amuse myself with the idea that this observation is original.—I am, etc.,

M. C. ANDREWS,
April 15. Surgeon Lieut.-Commander, R.N.V.R.

Ergotoxine in Shock

SIR,—With reference to the article on recent air-raid casualties by Dr. Margaret Ball and Mr. George Quist (February 22, p. 273), in which they report that "the results of the treatment of severe shock by replacement of fluid with blood and plasma were disappointing," I beg to suggest the trial, as an additional measure, of intramuscular injections of ergotoxine aethanosulphate 1/120 to 1/60 grain in this condition. Since these doses are regularly used in obstetric practice and in the treatment of migraine they may be employed without fear.

Ergotoxine is an inhibitor of sympathetic overactivity, and has been successfully used by Hassan and Mahommed (*Lancet*, 1940, 1, 1001) as an antidote to scorpion toxin, part of which is a strong stimulant of the sympathetic nervous system. Since we have no recognized drug at present with which to combat shock, the trial of ergotoxine in therapeutic doses in this condition is fully justified.—I am, etc.,

Capetown, April 6. J. WALKER TOMB, M.D.

Whither Welfare?

SIR,—The article on "Whither Welfare?" (May 10, p. 719) deserves most careful attention. The argument of Dr. Cicely Williams that more can be done to prevent disease than by any other method through the sensible teaching of home hygiene and right diet is put forward most convincingly and cannot be gainsaid. The practitioner treats disease but does not prevent it, and the medical research worker seeks for methods for immunization against or cure of disease, but the well-trained welfare worker, by teaching in the home, goes to the root of the whole matter, and, adequately supported, can stop disease appearing. How little the Medical Research Council realized this was shown by the fact that after my retirement it abolished the Department of Applied Physiology at the National Institute of Medical Research.—I am, etc.,

Chalfont St. Peter, May 11. LEONARD HILL.

New British Summer Time: A Criticism

SIR,—May I inquire whether certain disadvantages of the new summer time have been sufficiently considered from the medical standpoint? Speaking for my own district (the North-West), when any large-scale aerial attack has been made the alert has usually been sounded about one hour after black-out time, and I find that most people who do not regularly sleep in shelters have been in the habit of waiting up until this "danger" time has passed before retiring. If we consider the week before the advent of the new system we find that people were retiring about 10.30 p.m.; to-day we find that they are waiting up until 11.30 p.m. or midnight before they consider it safe to retire, and before the longest day arrives the "safe" time will be 12.30 to 1 a.m. So that, even if no raid develops, large masses of the population are missing a substantial proportion of their sleep; in the event of a raid the position is worse, since when the raiders depart (at present 4 a.m. to 4.30 a.m.) these people are left with only three to three and a half hours sleep.

Under the original British Summer Time these people would have retired one hour earlier, and after a long raid would have had an extra hour in which to sleep. I would go even further and suggest that it would be better to have turned the clock one hour backwards to G.M.T. (since the visitations of the Luftwaffe are independent of our own chronometric manipulations). This would time the raids to begin and end earlier, with obvious sleep-saving advantages at either end. From this point of view I venture the opinion that any advantages offered by the new British Summer Time are more than counterbalanced by the impairment of working efficiency through the needless loss of sleep it entails.—I am, etc.,

May 9. LESLIE BALLON.

Universities and Colleges

UNIVERSITY OF SHEFFIELD

The University Council made the following appointments on May 9: *Assistant Lecturer in Mental Diseases*: F. J. S. Esher, M.B., Ch.B., D.P.M. *Junior Demonstrator in Anatomy*: M. Laird, M.B., Ch.B. *Part-time Demonstrator in Anatomy*: Mrs. Mildred John, M.R.C.S., L.R.C.P.

The Council accepted the resignation of Dr. F. E. E. Schneider of the post of assistant lecturer in mental diseases with regret and thanked him for his services to the University.

ROYAL COLLEGE OF SURGEONS OF ENGLAND

At a meeting of the Council of the Royal College of Surgeons of England, held on May 8, with Sir Hugh Lett, President, in the chair, Mr. J. W. Walker and Mr. T. Harrison Butler were admitted to the Fellowship.

Mr. John Basil Hume was elected a Member of the Court of Examiners.

It was decided that the amount of the Cartwright Prize should be increased from £85 to £100.

The President was appointed, *ex officio*, a member of the Governing Body of the British Postgraduate Medical School for one year.

Diplomas

Diplomas of Membership were granted to the 171 successful candidates named in the report of the meeting of the Royal College of Physicians of London, published in the *Journal* of May 3 (p. 694) and to the following:—

N. Alders, V. R. Arulanandom, J. L. Ballantyne, P. L. N. Baly, M. Bates, R. I. S. Bayliss, A. B. Black, E. M. Cheffins, D. R. Christie, Doris Critchley, Aileen M. Dickins, A. Fessler, J. H. Fodden, H. A. Hashemian, M. Hewitt, M. H. W. Holloway, J. S. Johnstone, Anne E. E. Jordan, J. M. Joshua, H. H. Kennedy, A. Klidjian, Padma Kumar, K. R. Llewellin, T. P. Mann, J. H. G. Morris, M. Roth, Melicent E. Salmon, J. M. W. Sedgwick, Eleanor M. Singer, C. C. K. Smith, J. G. Stubbs, H. Williams, J. A. Williams, Jean K. M. C. Wilson, R. B. Zachary.

Medical Notes in Parliament

Milk Certificates

Mr. GROVES contended on May 7 that the form of certificate for additional supplies of milk to persons suffering from certain diseases was objectionable, in that a doctor was required to certify the precise disease from which the person in need of the additional supply of milk was suffering, and that the certificate had to be handed to the local dairyman, thereby making him and also his employees aware of information which should be strictly confidential. Major LLOYD-GEORGE said the views of the British Medical Association on this procedure had recently been received and were under consideration.

Alien Doctors in Pioneer Corps.—Mr. ERNEST BROWN told Mr. George Strauss on May 8 that the services of alien doctors in the Pioneer Corps were considered for employment in hospitals and institutions equally with others of allied or enemy nationality through the machinery set up by the Central Medical War Committee. Capt. Margesson had given instructions that every facility was to be afforded for their attendance at interviews with employing authorities and for their discharge from the Corps when employment was obtained.

Civil Nursing Reserve Call-up.—On May 8 Mr. GEORGE STRAUSS, in view of the shortage of trained nurses, asked what was the policy of the Government in calling up for service those who have registered their names, at the outbreak of war, on the Civil Nursing Reserve. Mr. BROWN replied that to utilize the services of any trained nurse member of the Civil Nursing Reserve not already in employment he had recently extended the scope of the Reserve to cover almost every type of hospital, including certain special hospitals where the shortage of nurses was acute. Where a trained nurse offered whole-time service without reservation as to place regional Nursing Officers could ordinarily post her without difficulty. This could not always be arranged, however, where the member's offer was restricted either to part-time service or to service in a particular locality or in some other way. Such members were now being approached and asked to offer service not subject to these limitations. The use to be made of their services would depend on the replies.

The Services

R.A.F. AWARDS

The George Medal has been awarded to Flying Officer Richard Garwood Robinson, R.A.F.V.R., and to Corporal John Taylor, R.A.F. The announcement of the awards in a *Supplement* to the *London Gazette* dated May 5, 1941, said: "One day in February, 1941, an aircraft crashed just beyond the boundary of an aerodrome. Flying Officer Robinson, medical officer at the station, was at the scene of the accident almost immediately, and was first seen crawling through heavy smoke and fumes, but when he had nearly reached the wreckage he was forced back owing to an explosion of one of the main petrol tanks. Undeterred, however, he returned to the seat of the fire, which was around the pilot's cockpit, where he was joined by Corporal Taylor, who had been playing football and had run to the crash clad only in his football attire. Together they attempted to extricate the only remaining member of the aircraft. To assist them in their efforts a foam apparatus was turned directly on them. Although petrol and oil tanks, ammunition, and verey lights were exploding Flying Officer Robinson and Corporal Taylor persisted in their efforts, and finally extricated the body. Both displayed great courage and a complete disregard for their own safety, and although both suffered from the effects of the foam sprayed on them it undoubtedly saved them from being gravely burned. On a previous occasion Flying Officer Robinson displayed the greatest courage in attempting to rescue the members of a burning aircraft, in spite of exploding bombs and ammunition."

CASUALTIES IN THE MEDICAL SERVICES

ROYAL ARMY MEDICAL CORPS

Prisoner of War

Temporary Lieut.-Colonel John Chiene Mackay, M.C., T.D.

EPIDEMIOLOGICAL NOTES

Infectious Diseases for the Week

Measles was the only common infectious disease, with an increase of 921 cases, which showed any considerable variation from the number of notifications of the previous week. The counties with an increased incidence were generally distributed over the country. The outstanding rise occurred in Birmingham C.B., where the number of cases notified went from 411 to 586. The greatest decrease was in Northamptonshire, where the notifications were one-third of those of the preceding week. There were 24 fewer notifications of whooping-cough in England and Wales. In Scotland there was also a fall in the incidence of whooping-cough. Glasgow accounted for 150 of the 219 cases.

Although the rise in the number of cases of scarlet fever was only 33 for the whole of England and Wales, almost half of the counties reported increases. In Middlesex notifications rose from 19 to 60, and in Essex from 34 to 50.

The number of notifications of diphtheria during the week did not vary greatly in the individual counties, compared with the preceding week. It has been more prevalent in the North Country than in the South.

Cerebrospinal fever, after the fall in notifications during the previous week, returned to the level around which it had been fluctuating since the week ending March 15. The increase of 44 cases was made up mainly of isolated cases spread over the country, but multiple cases were reported from areas that had no cases in the preceding week. The chief of these districts were Durham, South Shields C.B. 5, Bishop Auckland U.D. 4; Yorkshire, East Riding, Kingston-upon-Hull C.B. 7.

The epidemic of dysentery in Hemel Hempstead M.B., Herts, is decreasing: 30 fresh cases were reported in the whole county during the week as compared with 50 in the preceding week. The largest increases were from Lancashire, Lancaster M.B., where notifications rose from 1 to 12, and Surrey, Coulsdon and Purley U.D., from 0 to 14. Dysentery reappeared in Essex, Colchester M.B., after a lapse of one week; 4 cases were notified in this area, which recently had a severe outbreak. The number of cases in Lancashire, Whiston R.D., where an outbreak has lasted over two months, increased from 5 to 11.

No. 16

INFECTIOUS DISEASES AND VITAL STATISTICS

We print below a summary of Infectious Diseases and Vital Statistics in the British Isles during the week ended April 19.

Figures of Principal Notifiable Diseases for the week and those for the corresponding week last year, for: (a) England and Wales (London included). (b) London (administrative county). (c) Scotland. (d) Eire. (e) Northern Ireland.

Figures of Births and Deaths, and of Deaths recorded under each infectious disease, are for: (a) The 126 great towns in England and Wales (including London). (b) London (administrative county). (c) The 16 principal towns in Scotland. (d) The 13 principal towns in Eire. (e) The 10 principal towns in Northern Ireland.

A dash — denotes no cases; a blank space denotes disease not notifiable or no return available.

Disease	1941					1940 (Corresponding Week)				
	(a)	(b)	(c)	(d)	(e)	(a)	(b)	(c)	(d)	(e)
Cerebrospinal fever	326	18	77	4	14	390	22	72	4	10
Deaths		1	7				7	4		
Diphtheria	877	46	222	36	27	712	23	231	52	39
Deaths	1	1	4	1	2	22	1	6	1	—
Dysentery	131	21	32		—	44	3	30		—
Deaths		—			—			—	—	—
Encephalitis lethargica, acute	3	—	—	—	—	6	—	1	—	—
Deaths		—	1				—	1		
Enteric (typhoid and paratyphoid) fever	26	2	45	7	2	30	1	10	2	1
Deaths	1	1	1	1	—	1	—	—	—	—
Erysipelas			54	9	1			48	4	4
Deaths		—	—				—	—		
Infective enteritis or diarrhoea under 2 years										
Deaths	28	4	4	3	2	2	6	6	5	6
Measles	13,951	319	106		10	4,013	29	133		165
Deaths	16	—	—	1	—	5	—	1	2	2
Ophthalmia neonatorum	78	9	22	—	—	44	6	28	1	—
Deaths										
Pneumonia, influenzal*	1,156	50	20	4	2	815	46	12	6	8
Deaths (from influenza)	51	6	4	5	2	46	4	7	7	2
Pneumonia, primary	—	—	1336	16				201	15	
Deaths		30		12	10		62		9	11
Polio-encephalitis, acute	—	—				1	—			
Deaths		—					—			
Poliomyelitis, acute	7	—	—		2	4	—	1		—
Deaths		—					—	—		
Puerperal fever	1	1	10	4	2	—	—	7	1	1
Deaths		—					—			
Puerperal pyrexia	146	11	23		2	143	4	14		1
Deaths	—	—								
Relapsing fever	—	—			—	—	—			—
Deaths		—								
Scarlet fever	1,056	50	126	38	25	869	46	121	49	77
Deaths	—	—	2	—	—	1	—	—	—	1
Small-pox	—	—	—		—	—	—	—		—
Deaths	—	—	—	—	—	—	—	—	—	—
Typhus fever	—	—	—	1	—	—	—	—	—	—
Deaths			—	—	—			—	—	—
Whooping-cough	3,568	96	219		9	567	10	27		16
Deaths	36	—	10	1	—	6	—	—	—	2
Deaths (0-1 year)	429	41	77	29	20	376	50	77	27	32
Infant mortality rate per 1,000 live births)										
Deaths (excluding still-births)	6,744	1,054	749	233	251	5,134	872	716	208	167
Annual death rate (per 1,000 persons living)			16.3	15.5	22.0			13.8	13.9	14.7
Live births	4,984	345	889	279	164	6,504	963	973	367	252
Annual rate per 1,000 persons living			18.1	18.5	14.4			19.7	24.5	22.1
Stillbirths	213	14	50			294	42	45		
Rate per 1,000 total births (including stillborn)			53					44		

* Includes primary form in figures for England and Wales, London (administrative county), and Northern Ireland.

Medical News

A general meeting of the Medical Society for the Study of Venereal Diseases will be held at 11, Chandos Street, W., on Tuesday, May 27, at 2.30 p.m., when Dr. H. M. Hanschell will give an address on "Venereal Buboes."

Field-Marshal Sir Philip Chetwode, on behalf of the War Organization of the Red Cross and St. John, is opening this week the first convalescent hospital for civil defence workers. This hospital, in Buckinghamshire, was planned by Lord Horder and Mrs. Joan Woollcombe. It accommodates twenty-five beds for men and twenty-five for women, and the cases admitted will include ailments as well as shock and wounds. Its main purpose is to restore A.R.P. workers to health after illness. Patients will be selected through the country hospitality scheme, which continues to act as an independent body within the machinery of the Red Cross War Organization.

At the annual general meeting of the North of England Ophthalmological Society, held at Sheffield, Mr. H. Haward Bywater of Liverpool was elected president and Mr. Percival J. Hay of Sheffield secretary.

The Palestine Conference of Jewish Physicians was recently held in Tel-Aviv, when Arab, English, and military physicians were among the thousand delegates. The conference was greeted by representatives of the Government, the Municipality, and Jewish institutions. The discussions were mainly devoted to diseases of the blood.

A new division of chemotherapy has been formed in the National Institute of Health of the United States Public Health Service to be under the direction of Dr. William H. Sebrell, jun. The new unit will be concerned with research on sulphanilamide products, and with new synthetic drugs with anti-malarial properties, in order to make the United States independent from the Dutch East Indies supply of quinine. The division will have quarters at the National Institute of Health in Bethesda, Maryland. The building will also be the headquarters of the divisions of chemistry and zoology.

Dr. C. L. Herman, who died at Wynberg, Cape Colony, in August, aged 81, bequeathed £40,000 to the medical faculty of Capetown University for research work.

Letters, Notes, and Answers

All communications in regard to editorial business should be addressed to THE EDITOR, BRITISH MEDICAL JOURNAL, B.M.A. HOUSE, TAVISTOCK SQUARE, W.C.1.

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LETTERS, NOTES, ETC.

Chemotherapy in Otitis Media

Dr. L. B. SHELTON (Surbiton) writes: I was interested to read the article on chemotherapy in acute otitis media by Dr. J. B. Jessiman (March 15, p. 399). Before the use of chemotherapy in acute otitis media the results of previous treatment, with local application, drops, etc., were slow and obscure, and one was inclined to send such cases more frequently for consultation to hospitals for fear of complications, such as mastoiditis, etc. But with the advance of chemotherapy complications seem to have diminished. For the last eighteen months or so about nineteen cases of acute otitis media, ranging from children to adults, were treated at home with sulphapyridine with favourable results, and only one child, aged 2 years, was sent to hospital after three days' treatment—for fear of mastoiditis. This patient was kept at hospital and continued with sulphapyridine with good results and recovery. I have been using rather smaller doses of sulphapyridine than Dr. Jessiman reports, and I think I shall increase the dose in future. However, in most cases of acute otitis media, as soon as chemotherapy is started, there is evidence of improvement by the next day, in the lowering of the fever, less pain and discomfort, and on inspection a gradual resolution of the inflammation, congestion, and the bulging of the drum, or disappearance of vesicles on drum. Sometimes the "bulging" will burst and the discharge of pus will clear up in about fourteen days or so. I always order to be instilled in the ear, after the pus is cleared out, guttae glyc. ac. bor., and the application of some form of heat—in adults the ear over a jug of hot water for steam. Recently an adult aged 50 developed bilateral otitis media after a mild attack of tonsillitis. Sulphapyridine tablets were given and temperature went down next day. The left drum developed a small perforation which healed in about a week. The right drum took rather longer to clear up. I have not treated many cases of chronic otitis media, but in the few cases where chemotherapy was employed benefit was seen. I am now intending to try on some chronic otitis media cases with old-standing discharges the principle of the present-day treatment of war injuries—that is, packing the ear canal with powdered sulphapyridine; and from the results obtained in packing some septic ulcerated legs it seems probable that benefit will follow.

Antiseptic Snuffs

Dr. F. G. CAWSTON writes from Durban: Cleansing of the naso-pharynx with warm saline immediately relieves a sore throat, but most popular remedies are irritating to the mucosa and both lotions and oils may be unduly retained, so that further use of powders is indicated. Investigations with antiseptic snuffs, as reported in the *Journal* of February 1 (p. 145), are of great interest. It is, however, probable that some sulphanilamide compound may have to be taken orally to cure a deep-seated sinusitis associated with recurring colds (and causing tinnitus and deafness) and this may well be combined with appropriate vitamins.

The War and Opium

The twenty-fourth report of the Advisory Committee of the League of Nations on Traffic in Opium made last year to the Council drew attention to the possible repercussions of the war on national and international supervision of narcotic drugs in accordance with the Conventions, and on the activities of the committee. It stressed the "bitter lesson of experience" in the last war with the marked recrudescence of drug addiction and of illicit traffic. A resolution was adopted urging on the Governments concerned the imperative need for continuing, without relaxation, the international duties undertaken by the contracting parties. The instruction to the committee by the Council and the Assembly to convene a conference on the limitation of the cultivation of the poppy and the production of opium remains unfortunately in suspense, although the appointment of a new assessor (Mr. W. Gaskell) to prepare the work for this conference is announced. Reviewing the completed returns for 1938 of the world traffic in narcotics, the Advisory Committee concludes "that the world manufacture and consumption of the five principal drugs correspond to its legitimate requirements." These are, for the year: 42.7 tons of morphine, 611 kilos of heroin, 27.5 tons of codeine, 2.5 tons of dionine, and 3.8 tons of cocaine.

The Salvation Army's War Work

The red shield bearing the name of the Salvation Army has become a well-known emblem in every part of the present "battlefield." The principle on which this great voluntary organization is working is to go where the need is greatest. One of the principal features of its war work is the provision of mobile canteens. In the early part of the war a fleet of these operated among the Expeditionary Force in France. Since Dunkirk they have been at work in this country among Service men and also among civilian sufferers. Thus the announcement of the raiding of Coventry was accompanied by the statement that the first relief organization to arrive in the city after the bombardment was the Salvation Army with its mobile canteens. At the larger shelters in London and elsewhere the Salvation Army is one of the most conspicuous of the voluntary bodies distributing food at night and in the early morning. In an illustrated booklet which reaches us, describing the service on many fronts, it is related that in the early nights of the raiding a young woman officer of the Salvation Army offered to set up a first-aid post in a London tube shelter, but her proposal was coldly received by the stationmaster, who said that if she cared to mix with the crowd she was at liberty to do so. The opportunity soon came for her to give first aid to a confinement case and to a case of acute appendicitis, and to accompany both cases in the ambulance to hospital, with the result that the stationmaster asked her to carry out her original suggestion, and himself fitted up an ample space as a first-aid post.